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USSR REPORT

LIFE SCIENCES

BIOMEDICAL AND BEHAVIORAL SCIENCES

CONTENTS

BIOTECHNOLOGY

ENVIRONMENT

EPIDEMIOLOGY

AGROTECHNOLOGY

COMBATING COTTON PESTS, DISEASES IN TAJIKISTAN

Moscow ZASHCHITA RASTENIY in Russian No 11, Nov 84 pp 2-3

/Article by M.O. Oripov, head of Department of Agriculture and Food Industry for the Leninabad Oblast Committee of the Communist Party of Tajikistan: "An Important Element of the Agrochemical Service"/

/Text/ The workers in Leninabad Oblast are celebrating an important date -- the 60th anniversary of the formation of the Tajik SSR and the Communist Party of Tajikistan -- with new successes. In all branches there have been improvements in labor productivity and in the quality of the products being produced.

Agriculture throughout the oblast is developing at a rapid tempo. The kolkhozes, sovkhozes and interfarm enterprises have 235,000 hectares of irrigated agricultural land at their disposal, with 173,000 hectares of this amount being irrigated arable land. Although our leading crop is cotton, nevertheless large areas are occupied by orchards and vineyards. The diverse nature of the soil-climatic conditions and the mountainous terrain tend to complicate farm management and require the use of a differentiated approach for carrying out the agrotechnical and chemical measures needed for the cultivation of a particular crop. However the agricultural workers are successfully overcoming their difficulties and achieving considerable successes. Over the course of the past five-year plans, cotton production in the oblast has increased by a factor of 1.2, vegetables and melons -- by 1.7 and grapes -- by a factor of 2.4. Increases have also taken place in the production and procurements of livestock husbandry products. This is largely the result of work performed by specialists, individuals who are making creative use of the latest scientific and practical achievements in the use of chemical processes and in the protection of plants.

The agricultural chemists consider their principal task to be that of further raising the agricultural crop yields. They are aware that this task can be fulfilled only by making extensive use of fertilizer and plant protective agents, which assume special importance in connection with the conversion over to the industrial technology for the cultivation of agricultural crops. The system of protective measures being employed under our conditions is making it possible to obtain additionally from each hectare not less than 6-8 quintals of raw cotton, 5-7 quintals of tomatoes and cabbage, up to 8 quintals of corn grain and 8-10 quintals of fruit and grapes and to retain a high level of quality in the agricultural products.

Since that time when the adverse effect of the mass use of chemical agents on the agro-biocoenosis of cotton was proven, many changes have taken place in the system for protecting this crop. The areas of extensive aviation treatment have been reduced in size and a conversion has been carried out over to centralized spraying with the aid of ground equipment. The republic's scientists have defined the threshold for damage caused by the boll work and today a chemical campaign is waged against this pest only when there are not less than 10-12 young caterpillars per 100 plants. This approach has produced an annual savings of hundreds of tons of pesticides. The repetitive nature of treatments carried out against the worm has been reduced from 8-12 to 1-2. For the purpose of overcoming those pest populations which are resistant to chemicals, a system has been developed for alternating the preparations obtained from various groups of chemical compounds. The introduction of this system, the preferential use of low toxicity pesticides of a selective action and also directed treatments have proven to be of assistance in enriching the cotton fields with entomophages and restoring their useful activity.

This system is constantly being improved on farms throughout the oblast. Last year, for example, the multiplicity factor for treatments against the spider mite was 0.4 and against the boll work -- 1.6 times; on some tracts characterized by good agricultural practices, pesticides were generally not employed.

Many years of use have confirmed the reliability of the method employed: all of the products grown out on the fields are being retained. Each year the oblast's farms fulfill and over-fulfill their socialist obligations for the production and procurements of products. The oblast has repeatedly been declared the winner in the all-union and republic socialist competition. In accordance with its results for 1983, it was awarded the challenge red banner of the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Komsomol Central Committee.

Forty seven skilled specialists are working at the oblast and rayon plant protection stations and 114 agronomist-entomologists -- at the kolkhozes and sovkhozes. Seventy specialized plant protection brigades have been organized on the farms and they have at their disposal more than 500 tractor and approximately 2,000 knapsack sprayers. A staff for the protection of plants has been created on each farm. Each year 350-400 individuals participate in the work of inspecting the cotton plantings -- biology teachers, students and secondary school pupils. The chemical treatments are carried out only on those tracts where the number of pests exceeds the economic threshold.

A great amount of protective work is being carried out in orchards and vineyards. Reliable protection is required for forage crops. A campaign against locusts is being conducted on an area of 20,000-30,000 hectares, against mice-like rodents -- on 5,000-8,000 hectares and herbicides are being employed annually on roughly 100,000 hectares. The farms are receiving substantial assistance from mechanized detachments of Sel'khozkhimiya, which are applying fertilizers, herbicides, supplying mineral fertilizers and plant protective agents and spraying the sowings and plantings with pesticides.

Extensive use is being made of the biological method for combating cotton pests. Many farms throughout the oblast have biological laboratories which

are engaged in breeding trichograms and khabrobrakons. A biofactory at the Kolkhoz imeni Lenin in Proletarskiy Rayon is operating at full capacity. This farm is headed by A.S. Samatov, two-times Hero of Socialist Labor, deputy to the USSR Supreme Soviet, veteran of the kolkhoz movement and an initiator of use of the biological method in the oblast. At the present time, this farm serves as a center for training personnel for the kolkhoz biological laboratories. A biofactory is in operation at the Kolkhoz imeni Lenin in Isfarinskiy Rayon.

Over the past 5 years, the sowing areas protected by the biological method have been increased in size roughly seven times. Last year, some farms eliminated completely the use of chemical means for combating cotton field pests; 17,000 hectares of sowings were protected by creating favorable conditions for the development of natural entomophages. In addition to entomophages, which played an important role beyond any doubt, an entire complex of agrotechnical measures was also carried out on these fields. Trichograms and khabrobrakons are also being used successfully for protecting tomatoes and corn against the winter moth and the boll and other cutworms: in combination (when necessary) with subsequent treatments with dendrobacillin, this eliminates almost entirely the use of chemical means. Last year, as a result of having reduced the volume of chemical treatments and introducing the biological method into operations, the oblast's farms realized a savings of more than 2.5 million rubles.

Pheromon traps are employed for computing the number and determining the schedules for treatments carried out against the apple worm and grapevine leaf roller. This has made it possible to raise the effectiveness of the campaign against pests by 25-30 percent. Such traps are being used to combat cotton pests.

Under conditions involving further concentration, intensification and industrialization of agricultural production, it will be necessary to improve the strategy and tactics for combating harmful types and improving the deliveries to kolkhozes and sovkhozes of equipment and modern chemical and biological agents. More effective preparations are needed for combating the cotton worm, apricot chalcids, alfalfa weevil and bugs and also high quality microbiological preparations capable of being stored for extended periods.

It is known that the specific structure and numbers of pests are dependent upon the structure of the area under crops and upon changes in the ecological situation. Thus an expansion of the sowings of corn and vegetable crops led to the spread of winter moths and boll worms and a change in the ratio of areas occupied by cotton and alfalfa -- to an increase in the degree of harm caused by the alfalfa plant and field bugs and also the alfalfa weevil. These pests have not been studied adequately and the existing measures for combating them are not very effective. The greatest degree of harm caused by these pests coincides with the developmental period for the silkworm moth and this limits the use of chemical protective agents.

The increasing amount of damage being caused by the spider mite, aphids and thrips is arousing alarm. This is associated with the absence of the required number of diverse types of pesticides needed for alternating during treatments.

In addition, no recommendations are available for waging a biological campaign against suctorial pests. Greater attention must be given to introduction of the biological method for use of vegetable growing farms.

Solutions for these problems and an expansion of the arsenal of chemical and biological means will assist the plant protection specialists in improving their work and achieving new successes.

The oblast's farmers have undertaken raised socialist obligations for this current jubilee year. Not less than 247,000 tons of "white gold" and 300,000 tons of fruit and vegetable products and potatoes must be sold to the state. The specialists of the oblast's service for the use of chemical processes and plant protection are undertaking all possible measures aimed at ensuring fulfillment of the plans and obligations as outlined.

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WEED CONTROL MEASURES IN MINSK OBLAST

Moscow ZASHCHITA RASTENIY in Russian No 11, Nov 84 p 4

/Article by I.V. Dashko, deputy chairman of the Nesvizhskiy Rayon Sel'khozkhimiya Association: "In a Planned and Organized Manner"/

/Text/ The work carried out by a single agrochemical service is very diverse. I will discuss just one sector of its work -- the campaign against weeds.

Anti-weed measures in our rayon are being developed based upon field contamination charts, which the farm agronomists compose under the methodological guidance of the plant protection station. Here a great amount of assistance is provided by specialists attached to semprom /seed industry/, gosseminspektsiya, a station for the use of chemical processes and the Ganusov Experimental Station. They have been assigned individual farms throughout the rayon where they organize inspections and are held responsible for carrying out mapping work in a high quality and timely manner. We are maintaining special records on the more contaminated tracts, we are defining the work volumes and we are selecting the herbicides depending upon the predominant types of weeds. When necessary, the use of mixtures of preparations is being planned.

For the winter the association concludes an agreement with the farms for the carrying out of protective work in which the work volumes and schedules are defined. The winter period is a time used for the training of machine operators. The exercises are conducted by specialists attached to the rayon Sel'khozkhimiya organization, the protection station and sanepidsluzhby /sanitary-epidemiological service/. All of the machine operators undergo a medical inspection and receive instructions on safety measures.

All protective work is carried out by the rayon association using its own resources. Last year, such work was carried out on 44,000 hectares and herbicides were applied to 21,000 hectares using ground equipment; the association has 24 sprayers at its disposal.

Three service zones have been singled out for the purpose of providing the best crop protection work in the rayon. A plant protection agronomist has been assigned responsibility for each one of them. At the required time, the equipment is sent to the farms and the work is carried out using the team method. A team has two sprayers and a VR-3 water distributor. A team leader is selected from among the best machine operators and he is provided with a

leaflet containing instructions on the route of movement, the crop to be treated, the expenditure norms for the preparation and working liquid and the width of the swath and speed of movement of the assembly. A mobile repair workshop and transport vehicles for moving the fuel and pesticides are assigned to 3-4 teams. The workshop is operated by a special team of mechanics. The task of this team -- during the course of the day, to correct problems and to prepare the units for operations. We prepare the working liquid directly in the sprayer tank.

The conversion over to the team method of operation has made it possible to shorten the work schedules and improve the quality of the work. The equipment is being used in a more efficient manner and a reduction has taken place in the number of people handling the pesticides.

We are using only boom equipment for carrying out weed control work. We are producing the booms in an association workshop using our own resources. They are attached to an OVT sprayer and the swath width is 10 meters. In 1984, these units made it possible to carry out complete weed control work on sowings of flax, sugar beets, corn and grain crops.

The teams include many experienced machine operators with long periods of service. Last year the best indicators in the socialist competition were achieved by tractor operators M.A. Rachyek, I.I. Kiyko, I.I. Kandera, I.Yu. Petrovich, I.I. Chernyuk, I.A. Krupets, S.K. Karpach and V.I. Bulash.

The quality of the work is determined by a committee consisting of representatives from the rayon association and the plant protection service and also farm agronomists. Over the past several years, we have not received any complaints from the farms. The technical effectiveness of grain crop weed control work using amino salt 2.4-D is 90-95 percent; fine results were obtained at the Novaya Zhizn' Kolkhoz when simasine was used for weed control work with corn and at the Kolkhoz imeni Lenin -- from hexylur in a mixture with sodium trichloroacetate, applied prior to the sowing of sugar beets.

An agreement with a farm assumes that the use of herbicides will be combined with a high culture of farming. Great importance is attached to such agrotechnical methods as turning over of stubble and fall plowing. Almost all of the spring grain crop sowings are harrowed both before the seedlings have appeared and after they have appeared and this makes it possible to destroy 50-60 percent of the weeds. Last year, harrowing was carried out on 9,800 hectares of spring grain crops -- more than 80 percent of the sowings -- on farms throughout the rayon. This made it possible to reduce the number of weeds out on the fields, to lower the volume of herbicide usage and to carry out the work during the best periods. All of the sugar and fodder beet sowings were harrowed twice: following sowing and crosswise to the rows after the seedlings had appeared. Following this work the fields were free of weeds during the initial period of beet growth. In the case of potatoes, the campaign against weeds is being carried out using only agrotechnical methods.

We are destroying weeds on farm territories, peat bogs and on other tracts. By virtue of a decision handed down by the rayon executive committee, a special month has been designated for waging a campaign against weeds. An inspection committee has been created attached to RAPO /rayon agroindustrial association/

for the purpose of exercising control over the carrying out of anti-weed measures; it includes specialists from the administration, Sel'khozkhimiya, the plant protection station and the people's control committee. The inspection materials are published in the rayon newspaper and over the local radio.

The Sel'khozkhimiya Association workers would have achieved greater success if the teams had been supplied with more sprayers, since the productivity of the boom equipment is not very high. We have long been awaiting a solution for the problem concerned with the industrial production of highly productive boom equipment, for which there is a strong agricultural requirement.

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ECONOMIC EFFECTIVENESS OF HERBICIDES

Moscow ZASHCHITA RASTENIY in Russian No 11, Nov 84 pp 5-7

/Article by V.A. Zakharenko, professor: "Economic Effectiveness of Herbicides"/

/Text/ Herbicides play an important role in improving agricultural practices. In 1985 the volume of herbicide use throughout the world will increase by 23 percent (by 27 percent in the U.S.A.) compared to 1980 and their proportion with regard to the overall volume of pesticide use will be 42 and 62 percent respectively (see Table 1).

TABLE 1

Пестициды (1)	(2) Стоимость применяемых пестицидов (млн. дол.)					
	(3) в мире			(4) в США		
	1980 г.	1982 г.	1985 г.	1980 г.	1982 г.	1985 г.
Гербициды (5)	4891	5307	6022	2171	2418	2760
Инсектициды (6)	3916	4228	4764	908	1013	1128
Фунгициды (7)	2199	2417	2772	226	240	276
Прочие (8)	559	654	758	199	248	319
Всего (9)	11 565	12 606	14 316	3504	3919	4483

Key:
1. Pesticides
2. Cost of pesticides used (millions of dollars)
3. Throughout the world
4. In the U.S.A.
5. Herbicides
6. Insecticides
7. Fungicides
8. Others
9. Total

The principal bulk of the herbicides (85.4 percent in world farming and 90.8 percent in the U.S.A.) is applied to sowings of grain (corn, rye, wheat) and technical (soybeans, cotton) crops (see Table 2).

Approximately 30,000 types of weeds are found throughout the world, with roughly 300 types being considered as most dangerous. Usually, in order to lower the crop losses in specific regions to an economically tolerable level, an active campaign must be waged against 10-30 types of weeds, although these figures vary considerably in various countries. In the U.S.A., for example, the list of dangerous weeds includes 200 types.

The harm caused by weeds is indeed great: the potential crop losses caused by them amount to approximately 12 percent of the overall production of farming goods throughout the world. The losses and expenditures for combating weeds are estimated to be on the order of 14 billion dollars.

TABLE 2

Культуры (1)	Стоимость применяемых пестицидов (млн. дол.) (2)			
	(3) в мире		(4) в США	
	пестициды (5)	в том числе гербициды (6)	пестициды (5)	в том числе гербициды (6)
(7) Зерновые	4572	2490	1311	992
(8) Технические	3217	1686	1353	979
(9) Картофель и овощи	970	203	205	60
(10) Кормовые	129	51	56	25
(11) Плодовые и орехоплодные	1642	182	292	56
(12) Прочие	476	279	88	59
(13) Всего	11 006	4891	3305	2171

Key:

1. Crops
2. Cost of pesticides used (millions of dollars)
3. Throughout the world
4. In the U.S.A.
5. Pesticides
6. Including herbicides
7. Grain
8. Technical
9. Potatoes and vegetables
10. Forage
11. Fruit and nut
12. Others
13. Total

Rapid growth is being observed in the areas treated with herbicides. For example, such areas in the U.S.A. amounted to 48.6 million hectares in 1965, 10 years later -- 81 million hectares and in 1980 -- 121 million hectares.

The trend towards an increase in the volumes of herbicide use is typical of farming in our country. A chemical campaign against weeds has become a most important component part of the industrial technology for the cultivation of agricultural crops. In order for this work to be economically sound, the specific structure and level of crop contamination are determined and the agricultural methods employed for the cultivation of agricultural crops and the effectiveness of herbicides in combination with other methods for combating weeds are taken into account.

When evaluating the effectiveness of herbicides, a determination is made regarding the potential crop losses caused by the weeds, taking into account the degree of contamination and the harm level of the weeds, the crop remaining following the use of herbicides compared to the potential losses and a comparison is made of the additional crop and the savings in resources for tending the crops against the expenditures involved for the use of the herbicides. An analysis was conducted by agricultural crop groups: grain, technical, potato and vegetable-melon and forage.

Grain crops occupy 57.4 percent (1982) of the area under crops. This consists mainly of cereal grains -- spring and winter wheat, rye, barley, oats (90 percent), with a smaller proportion (10 percent) consisting of corn for grain, millet, buckwheat, rice and pulse crops. The predominant weeds in cereal grain plantings -- blue-bottle, black bindweed, knotgrass, wild mustard, common fumitory, chickweed, rye-brome, lamb's quarters, silky apre, Kentucky bluegrass,

wild oats, shepherd's purse, hemp nettle, goosegrass, wild radishes, field spurrey, field violets and field pennycress. Some perennial weeds are also harmful: field sowthistle, prickly lettuce, Russian sweet-sultan and couch-grass. Practically all cereal grain plantings are contaminated by weeds, spring wheat sowings -- 30 percent, oats -- 34 percent, barley and winter rye -- 40 percent and winter wheat -- 70 percent to a strong or average degree. Corn for grain, millet and rice grown to the south of the cereal grain crops are contaminated by specific weeds: on corn sowings there is a preponderance of dicotyledonous (lamb's quarters, redroot amaranth, tumbleweed amaranth) and herbaceous millet-like weeds and also perennial weeds (creeping thistle, field bindweed and couch-grass).

In 1981, according to data supplied by TsINAO /Central Institute for Agrochemical Services for Agriculture/, grain crops with a weak level of weediness occupied 55.6 percent of the areas, medium level -- 33.8 percent and high level -- 11.2 percent of the areas. The danger of crop losses caused by weak weediness -- 8.4 percent, medium -- 15.8 percent, high -- 22 percent and on the average -- 12.4 percent. Herbicides are being used in increasing volumes for preventing this danger from occurring: during the 1971-1975 period, they were employed on the average on 30 million hectares annually, in 1976-1980 -- on 40.6 million hectares and in 1981-1982 -- on 42.1 million hectares.

The principal herbicides being used on cereal grain crop plantings are preparations from the 2.4-D and 2M-4X groups, which mainly destroy dicotyledonous weeds, 2M-4XM and 2.4-DM groups -- dicotyledonous weeds which are resistant to 2.4-D; on the average, 1 ton of active herbicide agent used on grain crops (with no Sel'khozkhimiya mark-up) costs 2,292 rubles and the average expenditures for the preparations amount to 2.32 rubles per hectare. In the cultivation of corn, preparations from the 2.4-D Group, triazine derivatives (simazine, atrazine) and eradikan are applied for the most part; on the average, 1 ton of herbicide costs 3,762 rubles and the expenditures for the preparations amount to 7.36 rubles per hectare. In the cultivation of rice, use is made of propanid, ordram, sutan-plus and 2.4-D; the price per ton of herbicide is 6,909 rubles, the expenditures for them -- 42.66 rubles per hectare. When growing pulse crops, use is made of 2M-4XM, 2M-4XP, prometrine and linuron; the price per ton of herbicide is 3,020 rubles and the expenditures -- 10.1 rubles per hectare. During the 1976-1980 period, for expenditures of 349 million rubles for herbicides, for applying them and for harvesting the crops protected, an average of 14.2 million tons of grain was protected annually (see Table 3).

However, with the existing fertilizer application volumes the potential for their preventing crop losses is being realized by only 54 percent. The proportion of use of preparations having a dominant herbicide activity with regard to dicotyledonous weeds that are sensitive to 2.4-D is great. The danger posed by the spread of dicotyledonous and grass weeds which are resistant to 2.4-D requires an expansion in the areas treated by the new herbicides having greater activity. These latter herbicides are usually more expensive and thus the principles associated with the thrifty use of herbicides must be observed.

Technical crops as a rule are grown only in certain regions of the country in more intensive crop rotation plans and thus they are more susceptible to the

TABLE 3

Культура (1)	Обработанная площадь (тыс. га) (2)	Затраты (млн. руб.) (3)	Сохраненный урожай (4)		Экономия труда (7)		Чистый доход (млн. руб.) (9)	Рентабельность (%) (10)
			тыс. т (5)	млн. руб. (6)	млн. чел.-дней (8)	млн. руб. (6)		
Зерновые колосовые (11)	40 641	278,0	12 252	900,5	—	—	622,5	224
Кукуруза (12)	2973	38,7	1402	116,2	28,0	84,0	161,8	418
Рис (13)	632	30,0	474	99,1	—	—	61,9	230
Зернобобовые (14)	168	2,1	53	5,1	0,6	1,8	4,8	229
Итого (15)	44 414	348,8	14 181	112,2	28,6	85,8	851,0	244

Key:

1. Crop
2. Area treated (thousands of hectares
3. Expenditures (millions of rubles)
4. Crop protected
5. Thousands of tons
6. Millions of rubles
7. Savings in labor
8. Millions of man-days
9. Net income (millions of rubles)
10. Profitability (%)
11. Cereal grain crops
12. Corn
13. Rice
14. Pulse crops
15. Total

danger of weed contamination than are grain crops. The following weeds predominate in sugar beet sowings: black bindweed, wild mustard, lamb's quarters, wild radish, redroot amaranth, creeping thistle and field matricary; grain crop weeds -- Japanese barnyard millet, green bristlegrass, couch-grass; in cotton in the zone of irrigated farming -- lamb's quarters, black nightshade, amaranth, field bindweed and grain crop types -- Japanese barnyard millet, green bristlegrass, Johnson grass, Bermuda grass and also common reed and nut-grass. The potential losses in technical crops (see Table 4) are determined depending upon the level of crop contamination and the degree of damage caused by the weeds.

TABLE 4

Культура (1)	Посевы (%) с засоренностью (2)			Снижение урожая (%) при засоренности (6)			Средние потери урожая (%) (7)
	низкой (3)	средней (4)	высокой (5)	низкой (3)	средней (4)	высокий (5)	
Сахарная свекла (8)	33	56	11	11,0	21,6	34,4	19,5
Хлопчатник (9)	46	40	14	11,4	17,3	22,4	15,3
Подсолнечник (10)	45	39	16	8,1	15,4	21,8	13,1
Соя (11)	13	57	30	10,0	28,0	43,0	30,2
Лен (12)	13	30	57	9,25	18,5	26,6	22,0

Key:

1. Crop
2. Sowings (%) with weediness
3. Low
4. Medium
5. High
6. Yield reduction (%) for weediness
7. Average crop losses (%)
8. Sugar beets
9. Cotton
10. Sunflowers
11. Soybeans
12. Flax

The volumes of herbicide usage on technical crop plantings increased from 3.5 million hectares in 1971-1975 to 7.6 million hectares in 1981-1982. The

principal preparations used in the cultivation of sugar beets are betanal, phenazone, piramine, lenatsil, tillam, eptam, ronit, dichloralurea and sodium trichloroacetate; the average price for 1 ton of preparation was 1,992 rubles and expenditures for the preparations -- 19.2 rubles per hectare; in the cultivation of cotton (with use being made of kotoran, kotophor, treflan and sodium trichloroacetate) -- the figures are 1,420 rubles and 11.8 rubles per hectare respectively; in the cultivation of flax (2M-4X, triallata and sodium trichloroacetate) -- 964 rubles and 3.33 rubles per hectare; sunflowers (prometrin, treflan and chlor-IFK) -- 4,310 rubles and 26.7 rubles per hectare; soybeans (treflan, prometrin, linuron, vernam and bazagran -- 4,351 rubles and 24.2 rubles per hectare. Their effectiveness is presented in Table 5.

TABLE 5

Культура (1)	Обрабатываемая площадь (тыс. га) (2)	Затраты (млн. руб.) (3)	Сохраненный урожай (4)		Экономия труда (7)		Чистый доход (млн. руб.) (9)	Рентабельность (%) (10)
			тыс. т (5)	млн. руб. (6)	млн. чел.-дней (8)	млн. руб. (6)		
Лен (11)	1128	25,0	181	67	5,6	16,8	58,8	235
Хлопчатник (12)	1501	34,8	219	128	—	—	93,2	269
Сахарная свекла (13)	3041	60,2	5555	175	33,2	99,6	214,8	356
Подсолнечник (14)	256	2,6	34	6,2	1,1	3,4	7	269
Соя (15)	277	8,6	64	14	3,2	9,4	14,8	173
Итого (16)	6203	131,2		390,2	43,1	129,2	388,1	296

Key:
1. Crop
2. Area treated (thousands of hectares)
3. Expenditures (millions of rubles)
4. Area protected
5. Thousands of tons
6. Millions of rubles
7. Savings in labor
8. Millions of man-days
9. Net income (millions of rubles)
10. Profitability (%)
11. Flax
12. Cotton
13. Sugar beets
14. Sunflowers
15. Soybeans
16. Total

Computations have shown that the use of herbicides prevents only 16 percent of the potential losses in cotton, 32 percent for sugar beets and 20.5 percent for sunflowers. This underscores the need, to a greater degree than is the case for grain crops, for expanding the volumes and raising the effectiveness of the chemical method for combating weeds.

A campaign waged against weeds in potato plantings can provide a considerable increase in yield. Taking into account the specific structure of the weeds (lamb's quarters, common chickweed, joint weed and hemp nettle -- in the northern zone and amaranth and millet-like weeds -- in the southern), the level of weediness (weak -- on 49 percent of the areas, medium -- on 40 percent and high -- on 11 percent) and the danger of a reduction in yield (for weak weediness -- 7 percent, medium -- 16.3 percent and high -- 24 percent), the overall indicator for possible growth in yield as a result of the suppression of weeds is 12.7 percent and in physical terms -- 10.5 million tons. Thirteen percent of the vegetable crop areas have a weak degree of weediness, 60 percent -- medium degree and 28 percent -- a high degree of weediness; the potential danger caused by a reduction in yield -- 7.5, 18.4 and 27.4 percent

respectively; the overall indicator for possible growth in yields -- 19.7 percent or 16.3 million tons.

The use of herbicides on potatoes (698,000 hectares) during the 1976-1980 period (2M-4X, prometrin, linuron and sodium trichloroacetate), with a price of 706 rubles per ton, preparation expenditures of 10.2 rubles per hectare and overall expenditures of 9 million rubles, ensured annual protection for the crop on an average of 679,000 hectares, valued at 72 million rubles. But the herbicides prevented only 6.5 percent of the potential losses.

For combating vegetable crop weeds, use is made of propazine, prometrin, semeron, linuron, ronit, treflan, ramrod, daktal and trichloroacetate, with the average price for them being 4,416 rubles per ton and with the expenditures for the preparations amounting to 34 rubles per hectare. During the 1976-1980 period, an average of 490,000 hectares were treated annually and with expenditures of 25.5 rubles per hectare 693,000 tons of vegetables valued at 67 million rubles were protected against losses and a savings of 6.9 million man-days was realized in the carrying out of weed control work; the level of herbicide use achieved served to prevent 4.3 percent of the potential crop losses.

The strong possibility of a potential reduction in forage crop yields is appearing in connection with considerable areas: fodder root crops -- 19.2 percent, corn for silage -- 17.5, perennial grasses -- 12.9 and annual grasses -- 12.6 percent.

In 1976-1980, herbicides were used for cultivating corn for silage on 6.7 million hectares, the expenditures for treating the plantings and harvesting the additional yield amounted to 53.8 million rubles and the savings in labor for weed control work -- 64.9 million man-days valued at 194.7 million rubles and 21.3 percent of the potential crop losses was averted.

The application of herbicides to fodder root crops (154,000 hectares), with expenditures of 2.7 million rubles, protected a crop of 308,000 tons valued at 6.4 million rubles. The savings in labor expenditures for weed control work amounted to 0.8 million man-days (2.4 million rubles); 3.6 percent of the potential losses was averted.

When herbicides were used on perennial grasses (192,000 hectares), the expenditures amounted to 4 million rubles and the additional yield -- 243,000 tons valued at 12 million rubles; 3.2 percent of the crop was protected.

The data presented underscore the considerable reserves that are available for raising the effectiveness of the chemical method for combating weeds on grain, technical and forage crop sowings and also in the cultivation of potatoes and vegetables.

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EFFECTIVENESS OF WEED CAMPAIGN

Moscow ZASHCHITA RASTENIY in Russian No 11, Nov 84 p 7

/Article by V.G. Fedotov, assistant professor at Mari University and V.A. Sotnikov, chief of the Mari Plant Protection Station: "Effectiveness of Campaign Against Weeds"/

/Text/ During a field inspection for weediness, carried out in the Mari ASSR in 1970-1971, a predominance of young plants (60 percent) was observed together with a lesser proportion (40 percent) of perennial root-sucking plants. Later observations (1981-1983) revealed that 43 percent of the agricultural lands was contaminated by creeping thistle, 53 percent -- field sowthistle, 44 percent wild radish and 10 percent -- couch grass. Scentless mayweed is often encountered in winter grain crop plantings and in perennial grasses -- sorrel, dandelions and common wormwood. Thus a trend was established with regard to an increase in the proportion of perennial root-sucking weeds (sowthistle and field bindweed) and a reduction in certain spring weeds (wild radish, lamb's quarters).

The results of a study of the specific structure and number of weed plants at kolkhozes and sovkhozes throughout the republic are being used for preparing charts on the weediness of plantings. These data serve as the initial material for improving the systems for alternating cultivated crops in crop rotation plans, improving the tilling of the soil, validating the requests for procuring herbicides and soil cultivation implements (shallow plows, cultivators and others), developing systems for the use of herbicides, preparing planning-estimates documentation on the comprehensive agrochemical cultivation of fields, forecasting weediness and also for evaluating the effectiveness of anti-weed measures.

The mapping of fields has made it possible to develop a system for combating weeds, the principal elements of which are agrotechnical methods. Early and deep autumn plowing produces fine results. In the spring of 1983, all of the autumn plowed land (302,000 hectares) was harrowed in two tracks using heavy harrows and early spring harrowing was carried out on the entire area of winter crop sowings and on a considerable portion of the spring crops (more than 200,000 hectares). On the more weedy tracts of fallow fields (4,000 hectares), fine results were obtained from combining the agrotechnical and chemical methods.

Chemical weed control work is being carried out on practically all farms throughout the republic. Compared to 1970 when herbicides were applied to approximately 36,000 hectares of sowings, in 1981-1983 -- on the average to 155,000 hectares: 52 percent of the oat sowings, 54-58 percent of the spring wheat and barley, 69 percent of the vegetable crops, 91-96 percent of the fodder root crops and corn and to all of the spinning flax fields. It was noted that the grain crop yields increased as an increase took place in the sowing areas treated with herbicides. Thus, in Gornomariyskiy Rayon, where the volume of weed control work increased twofold over a period of 6 years (1978-1983), roughly 6.5 more quintals of grain were obtained from each hectare.

An autumn application of amino salt 2.4-D to stubble fields produced reassuring results in the campaign against sowthistle and field bindweed. At the Kolkhoz imeni Tukaya in Paranginskiy Rayon, for example, the use of this method raised the spring wheat yield by 1.4 quintals per hectare. In the Mary ASSR, the expenditures for carrying out chemical weed control work are being repaid by a factor of 3-7.

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BIOLOGICAL METHOD FOR CONTROL OF PESTS, DISEASES, WEEDS

Moscow ZASHCHITA RASTENIY in Russian No 11, Nov 84 p 18

/Article: "At the Soyuzsel'khozkhimiya Association"/

/Text/ In the interest of further expanding the volumes of use of the biological method for combating pests, diseases and weeds of agricultural crops and also for improving the mass breeding and effective use of useful insects and microorganisms, the Soyuzsel'khozkhimiya Association has handed down an order which calls for the following in particular.

1. For the republic, kray, oblast and rayon (inter-rayon) associations of Sel'khozkhimiya to:

a) develop measures for increasing the use of the biological method, especially on crops the fruit of which is used as food in fresh form and also in cotton growing regions and resort zones, within the limits of water basins and in the vicinity of water areas of the fish industry;

b) select biological laboratories and demonstration farms which are effectively employing biological agents and which are obtaining high yields in the absence of the use or with minimal use of pesticides and with schools for leading experience in use of the biological method being organized at these facilities;

c) organize a summarization and extensive publicizing of the operational experience of leading biological laboratories, biological factories and farms which effectively introduce the biological method into operations;

d) undertake additional measures aimed at regulating the supplying of production biological laboratories and biological factories with equipment and materials.

2. For the republic, oblast and rayon (inter-rayon) plant protection stations to:

a) establish planned control over the quality of the biological plant protection agents and over the observance of technological discipline during their production and use;

b) ensure the timely use of biological preparations while eliminating accumulations of carry-over residues.

3. For the Ukrsel'khozkhimiya, Moldsel'khozkhimiya, Kazsel'khozkhimiya, Kirgizsel'khozkhimiya, Turkmensel'khozkhimiya, Tadzhiksel'khozkhimiya and Azersel'khozkhimiya associations to create biological method departments (groups) in the plant protection administrations (republic stations).

4. For the plant protection administration of the Soyuzsel'khozkhimiya Association to:

a) ensure the development by 1 March 1985, jointly with VIZR /All-Union Institute for Protection of Plants/ and VNIIBMZR, of methodological instructions for the development, protection and practical use of natural useful entomophages and microorganisms, in the interest of limiting pesticide treatments for agricultural crops;

b) jointly with the State Inspection for Plant Quarantine of the USSR MSKh /Ministry of Agriculture/ and the Plant Protection Branch of VASKhNIL /All-Union Academy of Agricultural Sciences imeni V.I. Lenin/, prepare a statute on the introduction into the USSR of useful organisms for waging a biological campaign and also a long-range plan for importing them;

c) prepare data on the agricultural requirements for pheromons and pheromon traps for the 12th Five-Year Plan and for further into the future.

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UDC 632.937

BIOLOGICAL AGENTS FOR COMBATING PESTS, DISEASES ON SHELTERED GROUND

Moscow ZASHCHITA RASTENIY in Russian No 11, Nov 84 pp 18-19

/Article* by A.P. Yeremenko, scientific secretary for the Department of Plant Protection of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin: "The Biological Method"/

/Text/ A most important condition for obtaining high vegetable yields in hothouses is that of well organized plant protection against harmful organisms, with use being made mainly of biological agents. In production, we employ such effective biological objects as the predatory phytoseulyus mite, the enkarziya parasite, the predatory aphidimiz gall-midge and others. But notwithstanding the fact that the practical workers have at their disposal a complex of resources that can be used successfully for suppressing pests, the biological method for combating pests is still being introduced into operations all too slowly. It is being employed most of all on sheltered ground in the RSFSR, the Ukraine and in Belorussia. In the RSFSR, for example, active use is being made in hothouses of phystoseyulyus, trikhodermins, bactorodentsides, verticillin, gall-midges and enkarziya parasites. In increasing the volumes of biological protection work, a great role is being played by the Russian republic's biological laboratory, which not only provides methodological direction for the oblast biological laboratories but also provides them with useful insects and microorganisms and controls the quality of the biological agents being used.

At the same time, it is possible to cite oblasts, krays and even republics, for example Georgia, Azerbaijan, Kirghizia and Tajikistan, where as yet only a limited amount of attention is being given to use of the biological method on sheltered ground and very little biological material is being produced (V.Ye. Kuz'minov).

However, the operational experience with phytoseyulyus on the farms reveals that it is fully possible to breed zoophages in the various areas. Towards this end, it is sufficient for the associations of hothouse sovkhozes to have cost accounting biological laboratories which can supply the material for farms having small hothouse areas. Positive experience in the organization of such biological laboratories is available: the Belaya Dacha Sovkhoz is breeding

* Review of reports submitted during the All-Union Conference on the Biological Method, Riga, 1983.

phytoseyulyus, the Moscow region OPKh /experimental model farm/ -- enkarziya (both in Moscow Oblast), the Leningradskiy Sovkhoz (in Leningrad Oblast) -- the predatory gall-midge and so forth (N.V. Bondarenko).

A great amount of work is being carried out in connection with searching for promising species of entomophages and akariphages and developing and implementing the principles for selecting them. From among the akariphages, the species Amblyseius andersoni, A. reductus and A. longispinosus are considered to be promising. These are active obligatory predators which are resistant to raised temperatures, which possess an extremely high speed of food digestion and which are capable of feeding upon not only spider and other mites but also upon plant-eating thrips (I.A. Akimov, L.A. Kolodochka).

For combating spider mites on sheltered ground plants, great practical value is attached to the A. longispinosus species. A technology has been developed for the mass breeding of this akariphage.

The limited use of A. andersoni and A. reductus on sheltered ground is considered to be advisable.

The problem concerning biological protection for sheltered ground vegetable crops against aphids is extremely urgent. Studies testify to the possibility of effectively employing the larvae of the common aphis lion against them on green and flowering crops. The aphidophage produces the best results at moderate temperatures (approximately 25°).

Information is available on the high effectiveness from employing the Chinese aphis lion against aphids on sheltered ground cucumbers. Under production conditions at the Kolpinskiy Sovkhoz in Leningrad Oblast and with a concentrated infestation of the cucumbers by melon and large potato aphids (initial population of 70-100 specimens per plant), the release of larvae of the 2d age for this aphidophage at the rate of 1:10 made it possible to suppress the pest completely by the 10th day (Ye.Ya. Shuvakhina, L.P. Krasavina).

Comparative tests carried out on the common, seven-point and pearly aphis lion, using the method of seasonal colonization of the imago and the method of "flooding" releases of larvae against aphids on various crops, revealed that only the common aphis lion is of practical value, since an acceptable method has been created for its breeding on a mass scale (A.T. Ushchekov).

Since 1979, work has been underway at the far eastern station of VIZR /All-Union Institute for the Protection of Plants/ on the predatory Micromus angulatus aphid for the purpose of using it in hothouse vegetable production. The data obtained indicate a high ecological plasticity for this species and the possibility of its laboratory reproduction and use. The release of this predator at the Primor'ye and Lazurnyy hothouse combines in the Maritime Kray, at a sovkhoz for decorative crops in Vladivostok and on other farms has revealed a high technical effectiveness -- 80-99 percent (V.I. Potemkina).

Measures are being developed for the mass breeding of a newly introduced aphidophage -- the tsikloned beetle. This is a non-diapause species which can reproduce the year-round in a laboratory. Artificial nutrient mediums for the

larvae and imago of the predator are being developed and tested at the VIZR in the interest of lowering the cost and simplifying the technology for breeding the beetle (N.V. Shmettser).

A promising species has been found for the predatory Amblyseius mekenziei mite for combating the tobacco thrips on sheltered ground cucumbers. One of the principal factors for determining the effectiveness of the colonization of this predator is the temperature (G.A. Beglyarov, F.A. Suchalkin).

Interesting results have been obtained from experimental-production tests carried out on the enkarziya parasite: in Moldavia, for all regionalized (for sheltered ground) varieties of tomatoes, it is possible to achieve complete control over the breeding of the hothouse whitefly provided the parasite is released at a low initial number for the pest -- 1-2 imago per square meter (I.A. Zabudskaya).

As a rule, a number of pest species are found on sheltered ground and thus a complex of entomophages must be used against them and this is not always possible or advisable. The detection in nature of a polyphage capable of destroying various species of pests would solve one of the chief problems associated with the protection of hothouse crops.

T.V. Kryzhanovskaya and M.D. Prutenskaya believe that the predatory macrolofus bug (from the slepnyakov bug family) is just such a species and that it is capable of destroying aphids, whiteflies, thrips and other pests. The macrolofus is a zoophytophage and its predatory life style is manifest both in adult bugs and in larvae of all ages. As a polyphage, the bug applies itself in a different manner to the various pest species. If thrips, aphids and whiteflies are present simultaneously in the same hothouse, it will destroy the whiteflies first and thereafter the aphids and thrips. If they are not present, the predator may feed on spider mites. This characteristic of the bug makes it possible to employ it in various combinations with other biological means.

The researchers are presently devoting a great amount of attention to the trichodermin biological preparation for combating diseases on sheltered ground crops. They are testing it against cucumber root rot, grey rot and fusarial wilt of tomatoes and wire stem in tomato seedlings. Reassuring results have been obtained in a number of instances. Thus, according to data supplied by K.I. Kudryavtseva, the use of trichodermin lowered the damage caused to cucumbers by root rot by 33 percent and in the process the increase in yield amounted to 0.5-5.3 kilograms per square meter. During tests carried out at BelNIIZR, the preparation, prepared on the basis of a local strain, made it possible to reduce the disease by twofold and to obtain 24.3 kilograms of young fruit per square meter.

A study of trichotetsine, phytobacteriomitsine and trichodermin has shown that they have a fungicide effect on the pathogen of wire stem in tomatoes. During tests carried out at VNIIBMZR, with trichodermine being applied to the soil, the degree of damage caused to the plants by disease amounted to 6 percent compared to 16 percent in control. It was noted that phytobacteriomitsine and trichodermine raised the germinative capacity of the seed by 14-20 percent and stimulated the growth and development of the plants (L.D. Buymistru, L.S. Koretskaya).

A study was conducted at SibNIIZKh on the antagonistic activity of collected and newly isolated strains of the trichoderm fungus as it relates to the pathogen for tomato wilt. Based upon active strains, a preparation was developed which lowered the development of the disease and raised the yield from 5 to 59 percent (V.N. Kolomnikova).

At the present time, there is a great urgency attached to the development and introduction of biological agents and methods for protecting crops grown on sheltered ground. In recent years the scientists have prepared a method and technology for the breeding and use of biological agents for combating the principal pests and a number of diseases. This has made it possible to create a system of protective measures. However the scope and level of the research work and also the practical use of the means for biological protection are still far from the level of modern requirements and are lagging behind the rates of development for vegetable production on sheltered ground.

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UDC 632.51/.937.14

RUST FUNGUS FOR COMBATING THISTLE PLANTS

Moscow ZASHCHITA RASTENIY in Russian No 11, Nov 84 p 32

/Article by T.D. Runeva and M.M. Trushko, senior scientific workers at SibNIIZKh: "Rust Fungus for Combating Thistle"/

/Text/ Rust fungus Puccinia suaveolens was studied by A. Potapov (1925) in Irkutsk Oblast for the purpose of employing it against common thistle Cirsium setosum. Initially during laboratory tests and subsequently during field tests, he inoculated plants of this weed with uredospores. The results of some of the tests turned out to be positive -- all of the plants became infected. The following year a majority of them perished and the remaining ones were characterized by weak growth and the absence of the bushiness characteristic of healthy plants.

Over a period of a number of years, we observed the appearance of the disease in thistle plants under natural conditions. The initial signs of the fungus infection were noted during various periods. Obviously this depended to a large degree upon the spring temperatures. For example, during the warm spring of 1981 the initial signs of rust were observed on thistle plants on 27 May and during the cold and prolonged spring of 1983 -- not until 10 June; in 1967, which was distinguished by an unusually early and warm spring, they appeared on 19 May. By the middle of summer the sick plants were covered completely with uredopustules (the leaves were deformed), they had a depressed appearance and they did not bloom despite the fact that at times buds formed. By the end of the summer, they had perished and could be lifted very easily from the soil; their rhizomes were more yellow and covered with black lines.

During laboratory tests involving artificial contamination, necrotic spots rather than uredopustules appeared on leaves which had been inoculated with uredospores on the 6th day. A similar phenomenon was observed in connection with the artificial contamination of weeds in nature. This was obviously associated with the absence of the conditions required for the pathogen converting over to the reproductive stage. The following year uredopustules appeared on the contaminated plants during the month of June and in early July the weeds perished. We were unable to monitor the subsequent fate of the remaining plants (the test plot on the edge of a field was plowed under).

We consider it advisable to study rust fungus for the purpose of employing it against common thistle. The fungus is highly specialized and infects only

various species of thistle and does not pose any threat to cultivated plants. When resolving the problem concerning the possible use of this pathogen, the most aggressive strains of it should be selected.

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BIOPHYSICS

UDC 591.182+577.352

EFFECTS OF OUABAIN ON INTERACTION OF ATP WITH EXTERNAL SURFACE OF NEURONAL MEMBRANES

Yerevan DOKLADY AKADEMII NAUK ARMYANSKOY SSR in Russian Vol 74, No 1, 1984 pp 41-45

ARVANOV, V. L., SULEYMANYAN, M. A., MAZHINYAN, S. B. and AYRAPETYAN, S. N., Institute of Experimental Biology, Armenian SSR Academy of Sciences

[Abstract] Voltage clamp and radioisotope studies were conducted on the giant neurons of the snail Helix, to determine the effects of ouabain on the interaction of ATP with the external surface of neuronal membranes. Addition of ATP to the fluid bathing the external surface of type A neurons induced the appearance of influx currents, while application to the internal surface was without effect. In both types of application, ATP failed to induce current genesis in type B neurons. Analysis of volt-ampere characteristics of the type A neurons demonstrated that ATP-induced current generation was due to an increase in membrane permeability to Cl^- ions. The effects of ATP on type A neurons were completely abolished by the addition of ouabain, confirming previous studies indicating that ouabain inhibits activation of Cl^- channels. Since both acetylcholine and ouabain inhibited the binding of radiolabeled ATP to the neuronal surface, it appears that a close functional correlation prevails between ATP receptors and the receptors for acetylcholine and the membranous Na,K-ATPase. These observations suggest that in the Helix CNS ATP may function as a neurotransmitter. Figures 1; references 13: 3 Russian, 10 Western.
[1738-12172]

BIOTECHNOLOGY

INDUSTRIAL PRODUCTION OF REVERSE TRANSCRIPTASE

Moscow RABOCHAYA GAZETA in Russian 3 Feb 85 p 1

[Article by G. Khanov and V. Ovcharov]

[Excerpt] The industrial production of a unique preparation--reverse transcriptase--has begun at the Omutinsk Chemical Plant. Although its output of this unusual product is only tens of grams a year, this amount is enough for many thousands of ultra-fine genetic operations.

The first batch of this preparation, which is called 'revertase', has been shipped to research organizations of the USSR Academy of Sciences and the microbiology industry.

Commenting on this news, A. Bayev, member of the USSR Academy of Sciences nad academician-secretary of the academy's Department of Biochemistry, Biophysics and Chemistry of Physiologically Active Compounds, said: "The introduction of the enzyme 'revertase' into large-scale production by the Soviet microbiology industry is an important event for the further advancement of genetic engineering in our country.

"Soviet science has made a considerable contribution to the study of the mechanism of reverse transcriptase. The carrying out of the project 'Revertase' under Academician V. Engel'gardt's direction was a great step forward. A large group of researchers from socialist countries took part in the realization of this project. Since its successful completion, the demand for the preparation has been increasing year by year. Up until recently, the Ukrainian Academy of Sciences' Institute of Molecular Biology and Genetics was essentially the only supplier of it. The amounts requested by science and industry were growing constantly, however. The decision was thus made to introduce 'revertase' into industrial production."

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CSO: 1840/234 E

UDC 579.222:577.152].083.134

CULTIVATION OF X. BADRII ON VARIOUS MEDIA FOR RESTRICTASE Xba I PRODUCTION

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 12, Dec 84 (manuscript received 27 Oct 83) pp 48-50

PEREL'MAN, Ye. V., SHTANCHAYEVA, S. M., BULK, V. F., TARASOV, A. P., BAKH, N. L. and SEMINA, I. S., Central Scientific Research Institute of Vaccines and Sera imeni I. I. Mechnikov, Moscow

[Abstract] Various Soviet products were tested for suitability as nutrient media for the cultivation of X. badrii and production of high levels of the restrictase Xba I. Growth in Difco broth (USA) yielded four times as much Xba I activity as did growth on Soviet yeast-peptone medium per gram of biomass produced. However, on Soviet casein-salt medium the yield of Xba I was equivalent to that obtained with Difco, although the preparation was contaminated with considerably more nonspecific nucleases, Consequently, for the production of high yields of Xba I the casein-salt medium can be employed, but when emphasis is placed on the purity of Xba I, yeast-peptone is the medium of choice. Figures 1; references 2: 1 Russian, 1 Western. [245-12172]

ENVIRONMENT

ELECTROMAGNETIC CURRENT EFFECT ON FISH

Moscow VECHERNYAYA VOSKVA in Russian 11 Feb 85 p 2

[Article by K. Lysenko: "The Electrical 'Language' of Fish"]

[Text] A quiet underwater world--bright fish darting about behind the glass of large aquariums. And next to them--racks with a great deal of electrical instruments. We are in a laboratory that deals with problems of fish orientation, the USSR Academy of Sciences Institute of Evolutionary Morphology and Ecology of Animals imeni A. N. Severtsov. The role of electromagnetic fields in the life of underwater inhabitants is being studied here.

Results of one of the studies have shown that the fish are able to communicat with one another in a language of electromagnetic pulses. Special monitors have registered these signals. It has been found that the underwater inhabitants even use them to clarify territorial relationships with neighbors throughout the aquarium.

"The world of fish holds many secrets," says B. M. Basov, deputy chief of the laboratory and candidate of biological sciences. "Until now it has not been clear, for example, how huge schools of fish change the direction of their movement instantaneously and simultaneously. We are also investigating the mechanism that allows fish to sense earthquakes in advance. They perceive changes in the earth's electromagnetic field, sometimes better than devices invented by man. Fish also recognize impending catastrophe based on a change in this field. Results of the study will undoubtedly help seismologists in their difficult and very demanding work.

Of late, fish have also had to deal with fields of another origin. One must admit that it is hard to think of a European river without an electrical power line hanging over it, and around each line--a magnetic field. Isn't this harmful to inhabitants of the reservoirs?

"It harms individual species, catfish, for example," says my fellow conversationalist. "Nature has allotted them a special 'feeling' for all electromagnetic fields. Therefore catfish avoid swimming under the wires. It appears that soon we will be able to make recommendations on how to help these fish."

Here is one more experiment. A 400-liter aquarium was divided into five parts by stainless steel screens. Sixteen young fish were put into each chamber. The partitions functioned as electrodes. The knife switch was turned on. The current entered the tank.

Results of the experiment came to be known in a year. After 12 months the fish kept their former mobility and grew up. Existing in an electromagnetic field, they produced offspring. It appears that for many fish a weak field is harmless. Moreover, the experiment suggested the idea that the effect of the current can also be useful. It is merely necessary to assign it an optimum value. In particular, it was ascertained that electricity stimulates fish growth.

"Study of the life of underwater fish under electromagnetic field conditions is only the beginning of a great and important work," says I. I. Pyatnitskiy, senior scientific associate and candidate of technical sciences. "We must check the results of research at fish hatcheries. I hope that special reservoirs with electromagnetic zones will come about in the not-too-distant future. The fish itself will search for a better place to live, will take an electrical 'shower'."

Laboratory scientists are working on yet one more important problem--fish breeding.

"Fish often refuse to spawn because of caprices of the weather or a number of other reasons," says I. B. Yurkova, candidate of biological sciences. "Experiments were carried out. Females were placed in an aquarium with an electromagnetic field. This had a positive effect. Hundreds of young fish were born, whereas under ordinary circumstances the roe would have been lost. This characteristic of the current has been called electrostimulation. Of course, we will have to sit at the microscope for more than a month, investigating how the electromagnetic field affects the health of parent fish and their offspring. Nevertheless, it is a very promising method."

12262
CSO: 1840/230

MODEL OF CLEAN ENVIRONMENT

Moscow IZVESTIYA in Russian 22 Feb 85 p 6

BABLUMYAN, S., Special Correspondent, Yerevan

[Abstract] A novel center of ecologic-noospheric (noos = reason, mind) studies has been organized in Armenia. Its goal is to create a model of clean environment and to develop recommendations for other regions in the country. Armenia is a natural laboratory with 22 geographic, 8 hydrologic, 10 climatic, 17 soil and 24 plant zones along with the highest per capita ratio of scientists. Biospheric stations will be built to evaluate human relationship to nature without any harm to either side. Other studies will concentrate on development of closed water circulation systems, prevention of polluting emissions, noise abatement in cities, etc. It will also attempt to solve the problems of Sevan Lake, the only fresh water supply for the Republic. The work will be carried out under guidance from the USSR Academy of Sciences.
[271-7813]

EPIDEMIOLOGY

UDC 579.834.1:579.24

REVERSIBILITY OF PATHOGENIC CHARACTERISTICS OF VIBRIO CHOLERA UNDER EXPERIMENTAL CONDITIONS

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 12, Dec 84 (manuscript received 17 Oct 83) pp 54-59

URALEVA, V. S., CHEREPAHKINA, I. Ya., GULIDA, M. M., KUTYREVA, I. V., POMUKHINA, O. I., KOLESNIKOVA, L. I. and FETSAYLOVA, O. P., Rostov-on-Don Scientific Research Antiplague Institute

[Abstract] In vivo and in vitro passage conditions were investigated for their effects on reversion to pathogenic characteristics in noncholerigenic vibrios, and in mutants of virulent strains showing complete or partial loss of virulent characteristics. Both in vivo and in vitro conditions were shown capable of inducing reversion of certain factors related to virulence, such as adhesiveness, lecithinase and neuraminidase activity, increased motility, and viability. The extent of reversion could lead to complete transformation or recovery of cholerigenicity. In no case was hemolytic activity lost as a result of in vivo or in vitro passage, neither was cholerigenicity gained in hemolytic strains or mutants. Results on media supplemented with RNA were variable, yielding varieties with gains and losses of virulence factors. Optimum conditions for reversion to pathogenicity were provided by cultivation in intestinal loops of suckling rabbits. In general, vibrios with loss of one virulence factor tended to revert to cholerigenicity, while strains with loss of two factors and the hemolytic strains seemed incapable of such a transformation. Figures 1; references 14: 9 Russian, 5 Western.
[245-12172]

UDC 579.842.11:579.26

FATTY ACID COMPOSITION OF ESCHERICHIA COLI CELLS AND SURVIVAL RATE IN AIR

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 12, Dec 84 (manuscript received 2 Apr 84) pp 65-68

BOGOSLOVSKAYA, O. A., ANDREYEV, L. V., BURLAKOVA, Ye. B., GLUSHCHENKO, N. N. and KONYUKHOV, B. F., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences; Institute of Chemical Physics, USSR Academy of Sciences, Moscow

[Abstract] Several strains of E. coli were evaluated for aerosol survival time in relation to fatty acid composition, in order to assess the importance of fatty acids in viability under the selected experimental conditions. Regression analyses revealed that a positive correlation coefficient (0.73) prevails between the survival rate and the concentration of cyclopropane acids. In addition, the correlation coefficient for the ratio of cyclopropane acids to palmitoleic and survival was 0.86. Similarly, the correlation coefficient between the survival rate and the palmitic acid:palmitoleic acid ratio was 0.81. None of the other fatty acids correlated with the survival data. Correlation of the survival rate with the growth phase and the size of the pool of cyclopropane acids confirmed previous observations that the latter impart considerable resistance to an adverse environmental situation in the microbial world. Figures 2; references 9: 7 Russian, 2 Western.
[245-12172]

UDC 616.98:579.842.11]-036.2-074(048.8)

CONTROVERSIAL ASPECTS OF SYSTEMATICS OF CHOLERIFORM ESCHERIOSIS AGENT AND ITS LABORATORY DIAGNOSIS AND EPIDEMIOLOGY

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 11, Nov 84 (manuscript received 30 Dec 83) pp 3-9

AVDEYEVA, T. A., ROMANENKOVA, N. I., KLEGANOV, V. K. and POLOTSKIY, Yu. Ye., Leningrad Scientific Research Institute of Epidemiology and Microbiology imeni Pasteur

[Abstract] A review of Soviet and Western literature on the problems encountered in dealing with the clinical and laboratory aspects of choleriform escherioses is presented. Extensive studies have demonstrated that such clinical entities can be caused by a variety of enteropathogenic E. coli showing the same characteristics as agents causing a number of typical enteric infections. Consequently, the same bacteriologic studies can be employed in the diagnosis of choleriform escherioses. In terms of age factors and etiology, choleriform escheriosis shares common features with dysentery and dysentery-like E. coli infections, but differs from

colienteritis which typically affects only the youngest children. Therefore, a strict distinction should be maintained among children falling into the 0-11 months and the 1-2 years age brackets. In taxonomics, the Soviet authors feel that enteropathogenic E. coli should be divided into two broad groups: the colienteritis group of the very young children, and the escheriosis group in adults and older children. The latter group is then further subdivided into the dysentery-like pathogens, and those responsible for choleriform E. coli infections. References 60: 25 Russian, 35 Western.
[258-12172]

UDC 616.98:842.15]-022.39-036.2

ANIMAL CARRIERS OF SHIGELLA AND THEIR EPIDEMIOLOGICAL SIGNIFICANCE

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOLOGII
in Russian No 11, Nov 84 (manuscript received 1 Nov 83) pp 20-24

PRYAMUKHINA, N. S., KILESSO, V. A. and TIKHOMIROV, Ye. D., Central Scientific Research Institute of Epidemiology, USSR Ministry of Health, Moscow

[Abstract] A review is presented on recently accumulated data on the putative role of animals as carriers of shigella, and their role in human cases of shigellosis. Animals implicated as carriers include monkeys, cows, pigs, horses, dogs, tigers, cats, guinea pigs, etc., as well as birds, shellfish and fish. Shigella flexneri, especially serovars 2 and 4, is reported as the most frequently isolated agents of shigellosis in animals. However, analysis of carrier states shows predominance of Sh. dysenteriae, Sh. boydii, and Sh. sonnei. The epidemiologic significance, for humans, of the various animal carriers is unequal, and on that basis they can be divided into three categories. One group consists of monkeys, animals that can readily transfer the pathogens to humans. Another group is represented by marine animals, such as fish and shellfish, that of themselves are insusceptible to infection but can accumulate large numbers of shigella in their bodies from polluted waters. The final group is represented by flies, cockroaches, etc., that generally transfer the bacteria by contamination of food and fomites. References 50: 11 Czech, 2 Croatian, 4 Russian, 43 Western.
[258-12172]

UDC 616.98:579.842.15]-02-036.2(47+57)

SHIGELLOSIS SURVEILLANCE IN SELECTED AREAS OF USSR IN 1979-1981

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 11, Nov 84 (manuscript received 27 Oct 83) pp 36-40

TIKHOMIROV, Ye. D., PRYAMUKHINA, N. S. and BOBROVA, T. P., Central Scientific Research Institute of Epidemiology; All-Union Shigellosis Center, Moscow

[Abstract] Shigellosis surveillance was carried out in 25 areas of the USSR, encompassing all the European republics, Caucasia, Central Asian republics and various krays and oblasts in the RSFSR. Distribution of the various shigella species was quite uneven in the regions surveyed; however, in most cases a definite preponderance of Sh. flexneri was observed during the study period (1979-1981). In the latter case, the serologic subtype 2a predominated, while serovars 6, 16, and 4a showed a corresponding loss of importance. Specific studies in Moscow Oblast revealed an increase in spread of Sh. flexneri IV:7,8. In addition, the importance of Sh. boydii serovar 4 was found to increase in frequency in Georgia, Astrakhan and Tambov Oblasts, Kiev, Moscow, Murmansk, Ul'yanovsk and Chelyabinsk. References 15: 1 Czech, 6 Russian, 8 Western.
[258-12172]

GENETICS

UDC 579.842.11.04:615.216.5

EFFECTS OF TETRACAINE HCl ON TRANSFECTION AND TRANSFORMATION OF E. COLI K12 BY PHAGE pMB9

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 12, Dec 84 (manuscript received 29 Nov 83) pp 62-65

LIKHACHEVA, N. A., MOLCHANOVA, Ye. S., KIM, A. A. and IL'YASHENKO, B. N., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Standard microbiological techniques were employed to assess the effects of the local anesthetic tetracaine HCl (TCH) on transformation and transfection of E. coli K12 Hfr KL16 and its various mutants by phage pMB9, to evaluate the effects of membrane factors in such processes. In virtually all the strains low levels of TCH (0.002 M) diminished the efficiency of transformation and transfection, with the exception of the parental Hfr KL16 strain which showed an insignificant increase in transformation. The effects of TCH were attributed to diminished (1.2- to 7-fold) synthesis of external membrane proteins, largely falling into the MW category ranging from 24000 to 65000 daltons. The specific effects of TCH with respect to a given strain depend on the strain-specific proteins being inhibited. For example, in a mutant designated as No 6 a 65000 dalton protein was most significantly affected, whereas in mutant No 16 the specific ihhibition involved a 61000 protein. References 14: 4 Russian, 10 Western. [245-12172]

HUMAN FACTORS

QUESTIONNAIRE ASSESSMENT OF OCCUPATIONAL STRESS

Prague ZHURNAL GIGIYENY, EPIDEMIOLOGII, MIKROBIOLOGII I IMMUNOLOGII in Russian Vol 28, No 4, 1984 (manuscript received pp 391-407

HLADKY, A., Institute of Hygiene and Epidemiology, Prague, Czechoslovakia

[Abstract] A questionnaire approach was taken to the evaluation of occupational stress in administrative personnel and line workers at a polygraphic plant, encompassing 4800 women, to determine the validity of this method when analysis of the various pertinent factors is based on the Principal Components and Varimax techniques. On the basis of factor analysis, 98 questions out of a total of 160 were identified as providing key information on job stress, on the basis of which 16 factors were identified as being common to both groups of employees, two factors specific to the administrative personnel, and three specific for the line workers. The high correlations of internal consistency--0.959 for the line workers and 0.946 for the administrative personnel--point to the utility of the questionnaire approach. Figures 1; references 17: 5 Czech, 12 Western.
[1714-12172]

PROCEDURAL APPROACHES TO ASSESSMENT OF OCCUPATIONAL EXERTION: REVIEW OF SOVIET LITERATURE

Prague ZHURNAL GIGIYENY, EPIDEMIOLOGII, MIKROBIOLOGII I IMMUNOLOGII in Russian Vol 28, No 4, 1984 (manuscript received 4 Jan 83) pp 409-414

SHIROKOV, Yu. G. and SILANT'YEV, V. P., Scientific Research Institute of Labor Hygiene and Occupational Diseases, USSR Academy of Medical Sciences, Moscow

[Abstract] An analysis of Soviet literature in the field of labor hygiene and occupational diseases reveals basically two trends in the evaluation of occupation exertion; one relies on direct measurements, and the other on indirect. The former generally involves tensometric studies, while the latter usually utilizes tonometric assessment of specific muscle groups. The disadvantage of the latter approach, generally relying on dynamometric,

electromyographic or tonometric studies, is that it does not allow for a direct determination of the physical load acting on the human system during job performance. To improve the indirect method a device has been constructed that makes it possible to measure wrist exertion in Newtons along different points of measurement during actual work-related manipulations. In addition, the literature survey shows a definite correlation between motor activity and occupational morbidity, which apparently reflects dose-effect (exertion-effect) relationships. On the basis of such observations, it appears reasonable to expect the use of such measurement techniques to assess the probability of motor disorders. References 32 (Russian).
[1714-12172]

IMMUNOLOGY

UDC 579.842.1/.2.083.3

SYNTHETIC ENTEROBACTERIAL IMMUNOGENS. PART 1. IMMUNOGENICITY OF SALMONELLA TYPHIMURIUM O-POLYSACCHARIDE/SYNTHETIC POLYELECTROLYTE CONJUGATES

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 12, Dec 84 (manuscript received 6 Feb 84) pp 110-113

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[Abstract] Several techniques were employed for the preparation of conjugates of Salmonella typhimurium O-polysaccharide with acrylic acid/N-vinyl pyrrolidone copolymer (50:50, 100,000 MW), to test the immunogenicity of the conjugate, and the effects of the method of coupling on immunogenicity. Immunization studies on C57BL mice (100 µg, i.p.) showed that maximum yields of antibody-forming splenic cells were obtained with conjugation effected by acylation of hydroxyl groups with bromoacetyl bromide, and subsequent alkylation of amino groups [Kay, G., and Lylly, M. D., Biochim. Biophys. Acta, 198: 276, 1971]. The antibody response obtained with this conjugate even exceeded 8- to 10-fold that obtained with the O-antigen and the O-polysaccharide alone, with maximum antibody cells observed on the 8th postimmunization day. These findings indicate that even poor antigens, such as the O-polysaccharide, can be rendered highly immunogenic by conjugation with copolymers, and that immunogenicity is dependent on the method of conjugation. References 14: 6 Russian, 8 Western.
[245-12172]

INCIDENCE OF ANTI-TISSUE ANTIBODIES IN VARIOUS POPULATION GROUPS

Prague ZHURNAL GIGIYENY, EPIDEMIOLOGII, MIKROBIOLOGII I IMMUNOLOGII in Russian Vol 28, No 4, 1984 (manuscript received 31 May 83) pp 433-438

RUSAKOVA, Ye. V. and NEVINNAYA, A. P., Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow; Institute of Biophysics, USSR Ministry of Health, Moscow, USSR

[Abstract] The incidence of anti-tissue antibodies was assessed in healthy and ill adults (415) and children (308), to determine the general prevalence of autoimmune phenomena in the population at large. Adult pathologies included such entities as rheumatoid arthritis, rheumatism, mastitis, pneumonia, etc., while the pediatric cases encompassed respiratory diseases and hemoblastosis. Antibody detection relied on a microhemagglutination test utilizing glutaraldehyde-treated group O Rh(-) erythrocytes, demonstrated to bind anti-tissue antibodies, The majority of the healthy adults and children (79.2%) did not contain anti-tissue antibodies. Low antibody titers (1:2 to 1:4) were seen in 10.1% of the healthy adults and 28.8% of the children. High antibody titers (1:8) were detected in 3.4% of the healthy adults and in none of the children. In 12.9% of the adults and 26.9% of the children in the sick category, no antibody was detected, while high levels were seen in 28.3 and 40.8% individuals of these respective groups. The test developed for this study appears to be suitable for use in general screening for humoral autoimmune phenomena. References 33: 23 Russian, 10 Western. [1714-12172]

UDC 616.98:579.842.14]-022.369

EFFECTS OF R FACTORS FROM VARIOUS RESISTANT DONOR SALMONELLA TYPHIMURIUM ON PHAGE SUSCEPTIBILITY OF RECIPIENT S. TYPHIMURIUM

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 11, Nov 84 (manuscript received 6 Sep 83) pp 40-44

YAKOVLEVA, O. N., KHUDCHENKO, G. V. and PETROVSKAYA, V. G., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences; Central Scientific Research Institute of Epidemiology, USSR Ministry of Health, Moscow

[Abstract] It has been established that, generally speaking, "hospital" strains of Salmonella typhimurium cannot be phage-typed according to the Felix and Kellow scheme. Accordingly, conjugation studies were performed to determine the effects of R factors from such resistant strains on susceptible S. typhimurium strains in terms of phage typing. Following conjugation the recipients were transformed into nontypable cells, using the bacteriophage collection of Felix and Kellow. However, the recipient S. typhimurium were

still typable by the phages maintained by I. G. Chikaradze at the Tbilisi Scientific Research Institute of Vaccines and Sera. Consequently, the R factors appears to belong to the class of phage-restricting plasmids. In one case a recipient phagovar was transformed into the donor phagovar. References 15: 9 Russian, 6 Western.
[258-12172]

UDC 579.842.1.083.13

COST EFFECTIVENESS COEFFICIENTS IN BATCH AND MULTICYCLIC CULTIVATION OF CLOSTRIDIUM PERFRINGENS TYPE A

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 11, Nov 84 (manuscript received 6 Mar 84) pp 65-68

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[Abstract] Submerged batch and multicyclic cultivation of Clostridium perfringens type A was conducted on casein-pancreatic medium supplemented with 4-16 g/liter of glucose, to determine economic coefficients in terms of toxin production and maximum biomass accumulation. Analysis of the physiologic or functional status of the culture showed that, as the supplies of glucose were depleted, a high economic coefficient in terms of biomass ($Y_{x/s}$) was maintained by utilization of pyravate and alpha-ketoglutarate in the medium. Consequently, a satisfactory physiologic status of the culture prevailed in multicyclic cultivation despite accumulation of the keto acids as a result of their utilization, which occurred if the glucose concentration was less than 16 g/liter. In the system under study maximum economic coefficients, both in terms of biomass and toxin accumulation, were seen in 4 h, which coincided with the beginning of the stationary phase of growth. Figures 2; references 9: 7 Russian, 2 Western.
[258-12172]

UDC 579.842.14.083.3

IMMUNOCHEMISTRY OF SYNTHETIC ANTIGENS WITH SALMONELLA O-4 AND O-9 DETERMINANTS

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 11, Nov 84 (manuscript received 11 Jan 84) pp 69-72

POKROVSKIY, V. I., TENDETNIK, Yu. Ya., POKROVSKIY, V. V., CHERNYAK, A. Ya., LEVINSKIY, A. B., DMITRIYEV, B. A. and KOCHETKOV, N. K., Central Institute of Epidemiology, USSR Ministry of Health; Institute of Organic Chemistry imeni N. D. Zelinskiy, USSR Academy of Sciences, Moscow

[Abstract] Radical copolymerization was employed to synthesize synthetic antigens representing O-4 and O-9 determinants of salmonella, in which the alpha-allylglycosides abequosyl(alpha 1-3)mannopyranose (O-4) and tyvelosyl-(alpha 1-3)mannopyranose (O-9) were coupled to acrylamide. Immunization of rabbits with these synthetic antigens resulted in specific antibodies against the respective salmonella antigens, as demonstrated by the Ouchterlony and passive hemagglutination inhibition tests. In addition, the synthetic derivatives had a higher binding capacity for the antibodies than the native antigenic preparations, in view of the fact that more than 100 antigenic determinants were present per synthetic molecule, while the number of such determinants per molecule of the natural lipopolysaccharide complex is on the order of 3 or 4. An additional advantage of such synthetic antigens is their relative areactogenicity vis-a-vis the chemically more complex native antigens. Figures 1; references 10: 8 Russian, 2 Western.
[258-12172]

UDC 616.411-018.1-02:579.842.15]-092

VIRULENCE EFFECTS ON SPLENIC CATHEPSIN D ACTIVITY IN EXPERIMENTAL SHIGELLOSIS

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 11, Nov 84 (manuscript received 26 Apr 83) pp 72-76

BELAYA, Yu. A., KHASMAN, E. L. and POPOVA, L. Yu., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Cytoplasmic and lysosomal cathepsin D activity was followed in the spleens of CBA mice infected with virulent and avirulent Shigella flexneri over a 56 day period, to determine the effects of virulence on lysosomal membrane damage in such pathologic states. Infection resulted in variable fluctuations in cathepsin D activity, which was, however, related to the virulence factor. Virulent shigella induced a prolonged period of elevated enzymatic activity in both the lysosomal and cytoplasmic fractions which began to abate by the 56th day. The avirulent strains, antigenically similar to the virulent strains, induced more transient changes that affected essentially only the lysosomal fraction. These observations indicate that

virulence was directly involved in damage of the lysosomal membrane and leakage of the enzyme into the cytoplasmic compartment. In the case of infection with the avirulent cells essentially normal patterns of cathepsin D activity were seen by day 14. These observations suggest that analysis of splenic cathepsin D activity in animals infected with shigella may aid in the assessment of virulence. Figures 2; references 17: 9 Russian, 8 Western.
[258-12172]

UDC 579.842.15.083.3

BIOLOGICAL CHARACTERISTICS OF SHIGELLA SONNEI RIBOSOMAL VACCINE PREPARED BY POLYETHYLENE GLYCOL FRACTIONATION

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 11, Nov 84 (manuscript received 29 Aug 83) pp 77-81

LEVENSON, V. I., RUKHADZE, E. Z., FEDOSOVA, V. G., DZHIKIDZE, E. K. and STASILEVICH, Z. K., Moscow Scientific Research Institute of Epidemiology and Microbiology imeni G. N. Gabrichesvskiy; Institute of Experimental Pathology and Therapy, USSR Academy of Medical Sciences, Sukhumi

[Abstract] Extensive animal studies were conducted on ribosomal vaccines obtained from Shigella sonnei by ultracentrifugation or fractionation with polyethylene glycol, since the latter approach offers the advantage of technical simplicity and is relatively inexpensive. When used as immunogens in a variety of animals the two vaccines did not differ in potency or their O determinants, and both were nontoxic in mice and monkeys. Both vaccines were equally protective in guinea pig keratoconjunctivitis tests, and protected monkeys against experimental dysentery following a challenge with 75×10^9 virulent Sh. sonnei cells per os. Clinical trials shall be undertaken in humans to assess its utility in medical practice. Figures 2; references 18: 9 Russian, 9 Western.
[258-12172]

UDC 612.112.94.017.4-06:578.245

EFFECTS OF INTERFERON AND LIPOSOMAL INTERFERON INDUCERS ON RECOVERY OF NATURAL KILLER ACTIVITY AFTER IMMOBILIZATION STRESS

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 11, Nov 84 (manuscript received 15 Jul 83) pp 81-84

SUKHIKH, G. T., MEYERSON, F. Z., ZAN'KO, L. V., POVERENNYY, A. M. and FUKS, B. B., Institute of General Pathology and Pathologic Physiology, USSR Academy of Medical Sciences; Institute of Human Morphology, USSR Academy of Medical Sciences; Institute of Human Morphology, USSR Academy of Medical Sciences, Moscow

[Abstract] Role of interferon in the activity of natural killer (NK) cells in CBA and BALB/c mice was studied in a stress model, involving immobilization of the animals for 6 h and determination of the effects of interferon and its inducers on NK activity. Administration of mouse leukocyte interferon (800 U) intraperitoneally to control mice enhanced NK activity with respect to murine lymphoma UAS-1 cells, with inducers showing a similar effect. Stress alone resulted in depression of NK activity by 35-65%, but immediate post-stress interferon administration resulted in enhanced activity within 24 h. Intraperitoneal injection of the inducer poly(I:C) (50 µg) was even more effective with baseline activity recovered within 24 h and then exceeded. However, injection of 50 µg of poly(I:C) incorporated into liposomes led to an increase in NK activity that exceeded baseline levels within 12 h and continued to increase for the 36 h period of observation. It appears that stress acts via endogenous inducers of interferon, and that perhaps such an approach--therapeutic use of liposomal interferon inducers--may be employed in humans in correcting the deleterious effects of stress on tumor immunity.
Figures 1; references 7: 2 Russian, 5 Western.
[258-12172]

UDC 616.98-078.73

MONOCLONAL ANTIBODIES IN ENZYME-LINKED IMMUNOSORBENT ASSAYS FOR CONFIRMATION OF ANTIGENIC UNIVALENCE

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian
No 11, Nov 84 (manuscript received 30 Dec 83) pp 84-88

LEVI, M. I., VENGEROV, Yu. Yu., VOLKOV, D. V., LIVSHITS, M. M., APANOVSKIY, L. N., KUROCHKIN, S. N. and SVESHNIKOV, P. G., Central Control and Research Laboratory of Disinfection Station; Institute of Molecular Biology, USSR Academy of Sciences, Moscow

[Abstract] A combination of enzyme-linked immunosorbent assay (ELISA), using monoclonal antibody, and a standard neutralization test were employed to provide further confirmation for the univalent nature of an antigen isolated from Yersinia pestis. The capsular antigen was prepared by heat

disintegration of the cells at 100°C and subsequent molecular sieving through a Sephadex G-50 column. A fraction with high activity in the neutralization test and low activity in the double-sandwich ELISA consisted primarily of the univalent antigen. The polyvalent antigenic preparation was capable of competitive displacement of the univalent antigen from the antigen-antibody complex. However, fixation of the univalent antigen-antibody complex by glutaraldehyde precluded displacement. Figures 2; references 10: 4 Russian, 6 Western.
[258-12172]

LASER EFFECTS

HOLOGRAMS FOR TRAUMA DIAGNOSIS

Moscow IZVESTIYA in Russian 19 Feb 85 p 3

[Text] Leningrad--For the diagnosis of especially complicated traumas and fractures, specialists of the First Leningrad Medical Institute have recommended the use of a holographic method of examination instead of the conventional x-ray method.

The hologram produced by means of a laser on a light-sensitive plate reproduces a complete optical three-dimensional picture of the trauma. It makes it possible to detect even the most minute cracks and internal splinters.

"It is very difficult to make a three-dimensional image of biological tissue because of its great plasticity," said Prof. I. Nagibina of the Institute of Precision Mechanics and Optics. "Only by using fundamentally new recording methods were we able to obtain holograms of biological preparations. When the need arises, images from such negatives can be easily reproduced."

FTD/SNAP
CSO: 1840/274

MARINE MAMMALS

UDC: 591.423/424:591.3:599.53

EARLY EMBRYOGENESIS OF LUNG IN SOME TOOTHED CETACEANS

Kiev VESTNIK ZOOLOGII in Russian No 3, May-Jun 84 (manuscript received 18 Oct 82) pp 55-60

[Article by B. A. Sluka, Minsk Medical Institute]

[Text] Marine mammals, which are secondarily aquatic animals, have retained the pulmonary type of respiration inherent in terrestrial species. However, adaptation to marine life made it necessary for specialization and alteration of several vital systems of the body and, first of all, the system of respiratory organs, which is characterized by a number of specific distinctions (Lacoste, Baudrimont, 1926; Wislocki, 1942; Kleynenberg, 1956; Yablokov, 1961; Slijper, 1962; Berzin, 1971; Nesterov, Shapunov, Matisheva, 1971; Ridgway, 1972; Kooyman, 1973, and others). In spite of the fact that the morphological manifestations of the lung's adaptation to aquatic life have been demonstrated, early embryogenesis of this lung has not been investigated. In the literature there are only descriptions of a few sperm whale embryos, including a description of respiratory organs (Golub, Leontyuk, Novikov, 1968, 1970). At the same time, investigation of the distinctions and patterns of embryonic development of the lung of marine mammals could help comprehend several adaptive structural features, their origin and functions.

Material and Methods

We studied early embryogenesis of the lungs in the sperm whale (Physeter catodon L.) and Black Sea [bottlenosed] dolphin (Tursiops truncatus ponticus Barabash). The material consisted of 20 series of sperm-whale embryo sections 8.5 to 360 mm in length and 13 series of dolphin embryo sections 23.6 to 112 mm long, as well as lungs from large fetuses and newborn dolphins from 280 mm to 123 cm in length. The material was fixed in 10% neutral formalin. The embryos were imbedded in paraffin and cut into serial sections 15-20 μm thick with subsequent staining with hematoxylin-eosin, by Heidenhain's azan method, according to Hart, as well as for demonstration of mucopolysaccharides (PAS reaction and combined PAS-Hale test) and proteins. Several embryos were totally impregnated with silver nitrate salts according to Bielschowsky-Buke. Sections 5-7 μm thick of organs of different large fetuses were stained by the same methods.

Results

In sperm whale embryos 8.5 mm in length, the caudal end of the breathing tube is divided into two bronchi that end with epithelial buds submerged in the mesenchymal primordium of the lungs. In 13-19-mm sperm whale embryos, 3d-order bronchi appear in the lung primordium (Figure 1*а*). All of the bronchi are lined with stratified epithelium. The dolphin embryo 23.6 mm in length is characterized by presence of fourth generation bronchi and start of formation of a fibrous and cartilaginous membrane: there is consolidation of mesenchymal cells under the stratified epithelium (Figure 1*б*). The primordium of the lung is permeated with a network of blood vessels that accompany branchings of the bronchial tree.

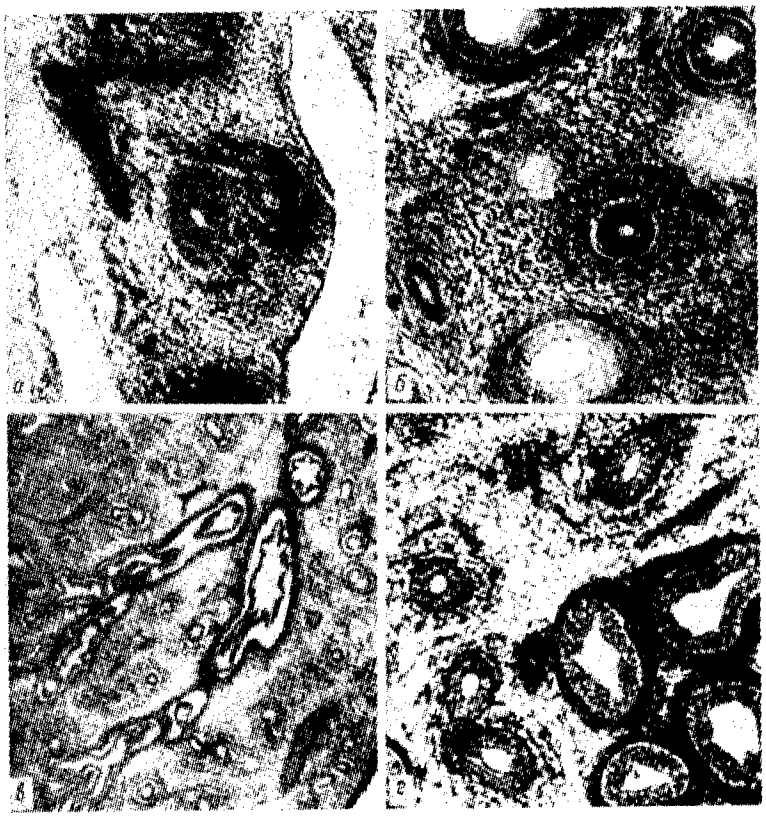

Figure 1. Formation of bronchial tree of lung in early embryogenesis of sperm whale and dolphin

а) sperm wale 13 mm long
б) dolphin 23.6 mm long
в) dolphin 46 mm long
г) dolphin 63 mm long

(*а*, *в*--hematoxylin-eosin; *б*--PAS; *г*--Bielschowsky-Buke
а, *б*, *г*--lens 9×, eyepiece 5×; *в*--lens 4.5×, eyepiece 5×)

In a sperm whale embryo 35-36 mm long (46-mm dolphin), the bronchial tree is more complicated (Figure 1*в*). The epithelium of the large bronchi gathers in folds, which is related to development of smooth muscle tissue in the bronchial wall. A layer of muscular elements is also demonstrable in 4th-5th order bronchi. Gradually (55-mm dolphin) the mesenchymal primordium of the lung starts to accumulate intensively acid mucopolysaccharides, and a strong frame of argyrophil fibers is demonstrable in it. A sperm whale embryo of the same length differs in that there is beginning differentiation of cartilaginous rings in the bronchi. They are formed of prechondral tissue in the main bronchi; the 2d order bronchi have primordia of partial mesenchymal rings. In 63- and 72-mm dolphin embryos, and 72- and 85-mm sperm whale embryos, one can distinguish three groups among the intrapulmonary bronchi that are not the same in degree of differentiation of the bronchial wall (Figure 1*г*). The largest bronchi contain primordia of rings of prechondral tissue. The second group consists of bronchi, in which the cartilage rings are formed of mesenchymal primordium. The third group refers to small bronchi formed only of epithelium with an underlying layer of myoblasts. All of the bronchi are lined with stratified epithelium.

In 82-mm dolphin embryos, the process of differentiation of cartilages of the bronchial tree extends distally: primordia of cartilage rings in 1st and 2d order bronchi are represented by prechondral elements with signs of ground substance, whereas in 3d order bronchi they are still formed by thickening of mesenchyma. Fine bronchi are lined with two-stratum epithelium. In sperm whale embryos 105 mm in length, the number of ramifications of the bronchial tree increases and the process of maturation of primordial cartilage extends to 3d and 4th order bronchi. In dolphin embryos 112 mm long and sperm whale embryos 151 mm in length, 1st and 2d order bronchi have cartilage rings formed of embryonic cartilage. In 3d order bronchi, the primordia of the cartilage rings are incomplete and formed of prechondral tissue. The fibrochondral capsule of these bronchi also contains smooth muscle cells. In the small bronchi, the cartilaginous primordia are formed by thickening of mesenchyma; there is a muscle sheath (Figure 2*б*) between the epithelium and cartilage, which is the basis for formation of elastic muscle sphincters.

One can distinguish the mucosa, submucosa, fibrocartilaginous and adventitial sheaths in the main and lobular bronchi of sperm whale fetuses 280-320 mm in length. In medium and small bronchi there is a muscle sheath (Figure 2*в*, *д*). The muscular layer is also formed in the bronchioles. There is a powerful vascular plexus in the mucosa. In dolphin fetuses 280 mm in length one first detects a primordium of the respiratory parts of the lung (Figure 3*а*): appearance of different-sized cavities in the form of blebs lined with cuboidal epithelium (future alveoli). The interalveolar septa are wide (20-30 μm) and filled with numerous networks of blood vessels. The arterial vessels of the lung contain elastic fibers in the form of isolated membranes. Elastic elements have not yet appeared in connective tissue. In a sperm whale fetus 360 mm long and dolphin fetus 370 mm in length the process of "cartilagination" involves almost the entire bronchial tree, and only the smallest bronchi do not contain cartilage. The respiratory part of the lung is characterized by some increase in quantity of alveoli. Elastic fibers appear in connective tissue of the lung. The interalveolar septa contain a formed double capillary network, which is inherent in marine mammals.

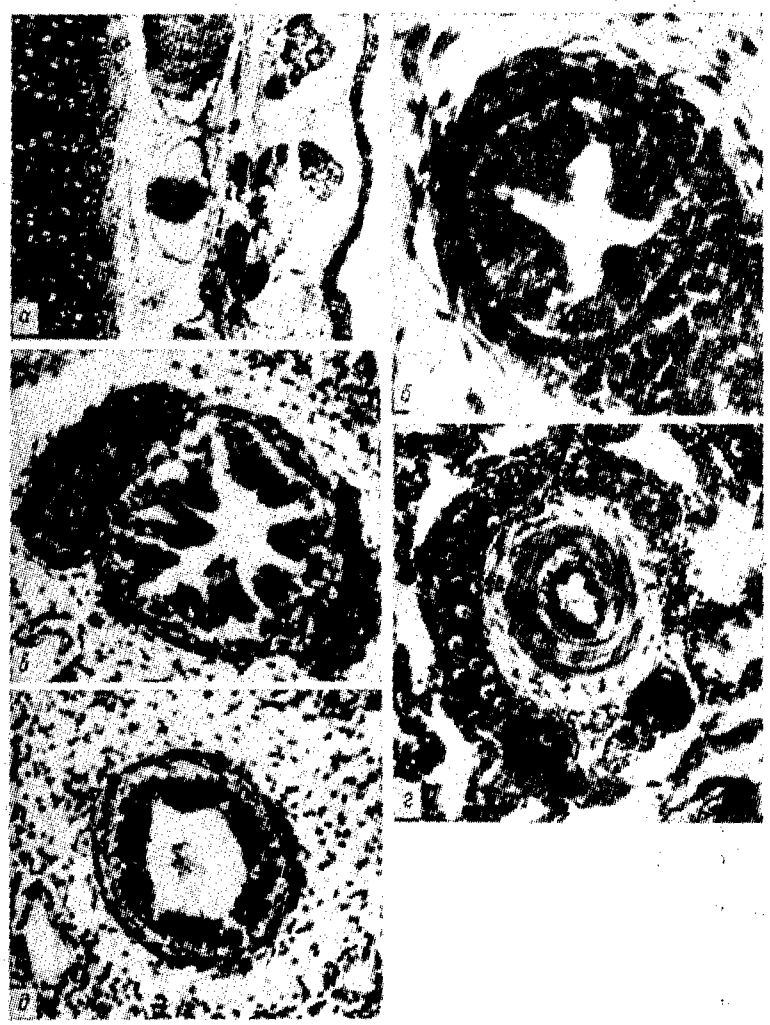

Figure 2. Structure of main (*а*) and intrapulmonary bronchi of different generations (*б-д*) in sperm whale and dolphin fetuses.

а) 110-cm dolphin
б) 151-mm sperm whale
в, д) 280-mm sperm whale
г) 123-cm dolphin

(*а*, *в*, *г*--azan; *б*, *д*--hematoxylin-eosin; *а*--lens 9×, eyepiece 5×; *б-г*--lens 20×, eyepiece 5×)

Shortly before birth (100-110-cm fetuses), the dolphin's main bronchi have a formed wall (Figure 2*а*). The mucous membrane of these bronchi is lined with stratified epithelium. Subepithelial connective tissue contains a powerful frame of longitudinally oriented elastic fibers. There is development of mucosal and submucosal blood vessel plexi that lie on several levels and consist of vessels of the lacuna type. Primordia of bronchial glands are demonstrable along the large bronchi, and their cells accumulate secretions containing acid mucopolysaccharides. Medium and small bronchi contain no glands. The

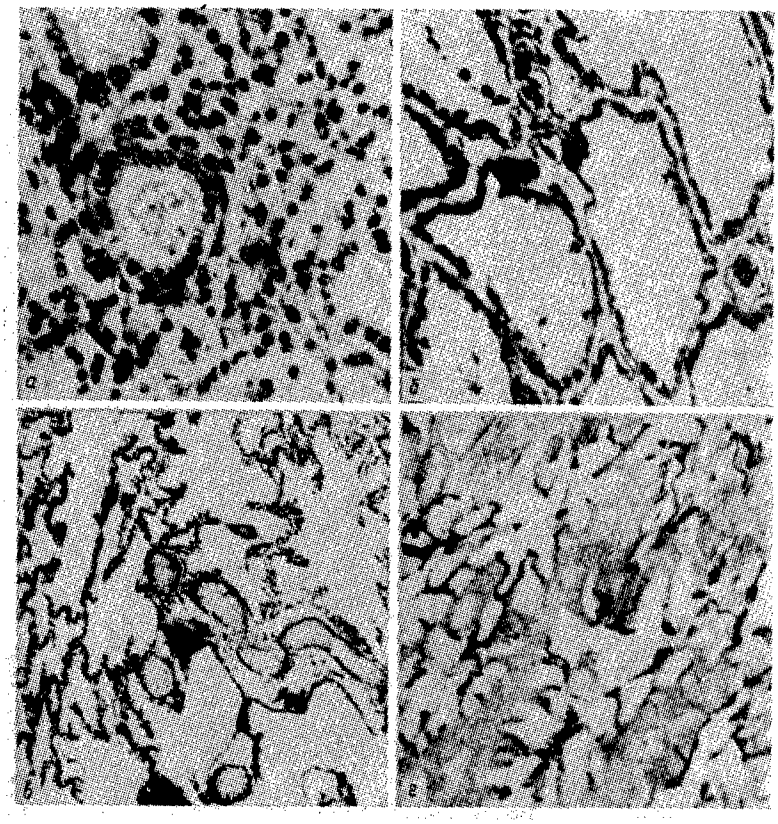

Figure 3. Structure of alveolar compartments of lung in late dolphin embryogenesis

а) 280 mm in length *б*) 100 cm *в*) 110 cm *г*) 123 cm

(*а*--hematoxylin-eosin; *б*--PAS-Hale; *в*--azan; *г*--Hart; *а*, *б*--lens 20×, eyepiece 5×; *в*, *г*--lens 9×, eyepiece 5×)

fibrocartilaginous sheath is rigid. The large bronchi are formed by embryonic cartilage with a small amount of ground substance and isogenous groups of cells. In the terminal parts of the bronchial tree (before the respiratory bronchioles) the cartilaginous primordia have a prechondral structure. The elastic shell is developed in all large bronchi. The intrapulmonary arteries also contain numerous elastic tunics; elastic fibers are also demonstrable in the walls of veins. In the respiratory regions, one can distinguish alveolar passages of a saccular form ending with forming alveoli (Figure 3*в*) which, however, are still small and fused. The interalveolar septa grow thinner, and their minimum thickness is 5-8 μm; they contain a double capillary network (Figure 3*б*) that surrounds the alveoli. The lung of the newborn dolphin (123 cm long) is notable for formed alveolar passages, numerous open alveoli with better developed elastic shell. There are elastic rings (Figure 3*г*) in the ostia of the alveoli. Respiratory bronchioles have powerful myoelastic sphincters (Figure 2*г*).

Discussion

Early formation of the bronchial tree is typical of embryogenesis of the lung of marine mammals, as in terrestrial animals; development and differentiation

of respiratory parts are shifted to a later stage of embryonic development. Differentiation of the bronchial wall reveals a craniocaudal gradient, which reflects the order of development of primordia of different generations of the bronchial tree. Cartilaginous elements are demonstrable in the bronchial walls first in the form of open rings, but they gradually become complete. Cartilage is contained in all parts of the bronchial tree, including the respiratory bronchioles, which determines the rigid construction of the bronchial tree even in early embryogenesis. As compared to the dolphin, the rigid bronchial skeleton of the sperm whale is formed faster, and this is related to its ecological distinctions.

In embryogenesis, bronchial glands are developed only in the walls of the large bronchi. This apparently reflects the general evolutional direction noted by Antipchuk and Soboleva (1976) and is manifested by poor development of the glandular system of respiratory organs of marine mammals because of the distinctions of their heat-regulating mechanisms.

Intraorganic blood vessels of the lung are of the elastic type. A system of elastic membranes, which are encountered not only in arteries, but veins, is demonstrable in them quite early. This provides for resilience of vessels, makes them stronger, which prevents collapse of their walls when the animal submerges. At the same time, the blood vessels of interstitial tissue and large bronchi form multilayered vascular plexi of the sinus type, which make it possible for blood to flow slowly in the organ and to be deposited. Such a device can be viewed as a mechanism that warms air entering the conductive parts of the lung. Belanger (1940) believes that the arterioles and venules of the lung are a part of the heat-regulating system of aquatic animals. On the other hand, presence of sluggish blood flow in the lungs is instrumental in better utilization of oxygen and nutrients by tissues in the gas-exchange process. Korzhuyev (1971) has shown that aquatic animals make fuller use of blood oxygen than terrestrial species. Furthermore, since excitability of the cetacean respiratory center for CO_2 content is diminished, and it depends on partial oxygen tension in blood (Irving, 1939; Kreps, 1941), early development of lacunar vascular networks in the lungs becomes understandable.

The connective tissue of the lung contains a well-developed argyrophil shell and well-developed system of elastic fibers, which give strength and elasticity to the organ as a whole (rigid construction of soft shell of the lungs). This adaptive distinction, which was noted by Renzoni (1960), Engel (1966), Berzin (1971) and others in adult animals, is formed rather early in embryogenesis, which is necessary to counteract hydraulic pressure when the animal submerges and possible compression of respiratory regions. A system of myoelastic sphincters begins to be demonstrable in small bronchi and bronchioles when embryos are 63 mm long, and by the time of birth it is also formed.

Before birth, the interalveolar septa remain rather thick and contain a large amount of interstitial tissue. Murata (1951) observes that their thickness reaches 60 μm in an adult sperm whale. It is 20-30 μm in small whales (Belanger, 1940). With such a thickness of the interalveolar septum and its structural distinctions (presence of compact bundles of collagen and elastic fibers), the type of blood supply and gas exchange inherent in higher forms of terrestrial mammals is inadequate. For this reason, during formation of

alveolar parts of the lung in embryogenesis, a double capillary network develops that surrounds the alveoli, which brings the structure of alveolar septa of marine mammals closer to their structure in lung-fish, some Caudata amphibians and reptiles. On this basis, Antipchuk and Gibradze (1973) believe that the change to an aquatic environment and its relative stability were instrumental in preserving in cetaceans the ancient structural signs of the pulmonary capillary system. We believe that it was necessary to preserve such a capillary system due to the large thickness of interalveolar septa, which make gas diffusion processes difficult. The double capillary network slows blood flow and, along with other mechanisms, facilitates the diffusion process, thereby providing for fuller absorption of blood oxygen. By the time of birth, a system of elastic rings is also formed in the respiratory regions, in the ostia of the alveoli, which permits altering the size of the lumen in the entrance to the alveolus. The subsequent process of differentiation of alveolar parts of the lung is probably related to activation of the organ's function.

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SOME MORPHOLOGICAL AND FUNCTIONAL DISTINCTIONS OF SPERM WHALE LARYNX

Kiev VESTNIK ZOOLOGII in Russian No 3, May-Jun 84 (manuscript received 20 Jan 83) pp 60-64

[Article by A. P. Manger, Institute of Zoology imeni I. I. Shmal'gauzen, UkSSR Academy of Sciences]

[Text] The morphological distinctions of the respiratory system of toothed cetaceans, in particular the Physeteridae, are related primarily to the need for reliable protection of lungs against water. The larynx plays the leading role in the class of anatomical structures that perform the function of closing the respiratory tract when submerging to significant depths.

Nevertheless, in the available literature there has still not been in-depth coverage of the structures of the larynx that perform such important functions as respiration, reflex closure and sound production. In the limited number of publications dealing with morphology of the larynx of Odontoceti (Watson, Young, 1880; Benham, 1901; Hein, 1914; Hosokawa, 1951; Kleynenberg, Yablokov, Bel'kovich, Tarasevich, 1964; Malyshev, 1969; Gracheva, 1971; Yablokov, Bel'kovich, Borisov, 1972; Manger, 1974, 1979), little attention is given to the adaptive distinctions of the sperm whale larynx. Even in the rather comprehensive monographic review by A. A. Berzin (1971), the Physeteridae larynx is discussed only in relation to specialization of the respiratory system for deep-water submersion.

The material for our anatomical and histological studies consisted of the larynx from four sperm whale fetuses, the age and sex of which were not determined. In addition, using the reconstruction method, a study was made of the cartilaginous skeleton and point of fixation of the laryngeal musculature of an adult female 11.2 m in length.

The cricoid cartilage is the base of the laryngeal skeleton and, unlike delphinids, its arch closes into a complete cartilage ring. The thyroid cartilage, which consists of a body and two pairs of cornua--cranial and caudal--

going from it, is the largest in the laryngeal frame. The latter pair is better developed and articulates with the lateral surfaces of the cricoid cartilage plate. The cranial, thick edge of the body of the thyroid cartilage is immobile and fused with the base of the epiglottis which, together with the pair of arytenoid cartilages, forms the aryepiglottic tube, which is curved in a craniodorsal direction and considerably distorted to the right (Figure 1, 2). There is a slit-like orifice, the entrance to the larynx (aditus laryngis), circumscribed on the sides by aryepiglottic folds that are a duplication of the laryngeal mucosa; it is situated on the anterioposterior thickened end of the tube. The height of the aryepiglottic folds on the preparations examined is almost the same as of the epiglottis. The free anterior edge of the fold is somewhat thickened and contains no cartilaginous elements.

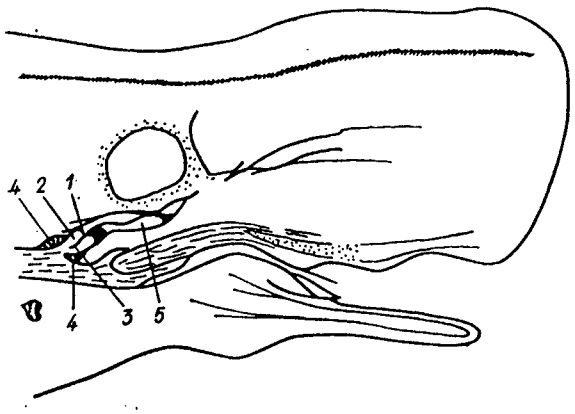

Figure 1.
Parasagittal section of sperm whale head
1) aditus laryngis
2) aryepiglottic tube
3) aryepiglottic fold
4) palatopharyngeal sphincter
5) osseous naris

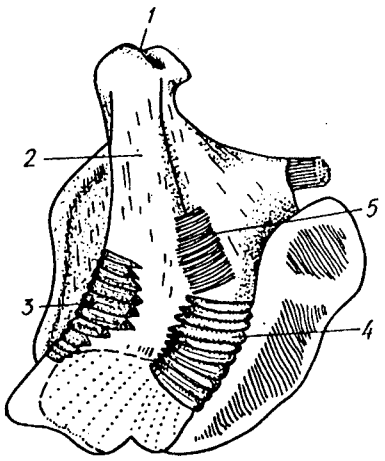

Figure 2.
Musculature of sperm whale larynx
1) aditus laryngis
2) aryepiglottic tube
3) transverse arytenoid muscle
4) arytenothyroid muscle
5) aryepiglottic muscle

Just below the entrance to the larynx, the aryepiglottic tube is invested in a well-developed palatopharyngeal sphincter in the sperm whale. The fibers of the sphincter are directed almost circularly and, when contracted, press the arytenoid cartilages tightly to the epiglottis, thereby closing the aditus (Figure 1). The palatopharyngeal muscle, which is a derivation of the soft palate of toothed whales in the opinion of some authors (Druzhinin, 1946), reaches maximum development in Physeteridae, which are typical divers. When these muscles contract, the larynx (namely, its thickened apex) is held constantly in the single ["unpaired"] nasopharyngeal orifice of the pharyngeal cupula, adhering firmly to its bony walls. This intranasal position of the entrance to the larynx is inherent to some degree or other in all cetaceans; however, in some of them, particularly small toothed whales (Rodinov, 1974), the apex of the larynx is situated in the bony nares only when diving. At small depths and during expiration-inspiration, in the opinion of the author the larynx descends ventrally and is beyond the sphere of action of the

palatopharyngeal sphincter. In the sperm whales we examined, the entrance to the larynx is always contained in the osseous nostrils, as in beaked whales, which are also divers (Yablokov, 1961; Bersin, 1971), because of which there is full and constant separation of respiratory and digestive tracts.

The arytenothyroid muscle, which occupies the space between the plates of the thyroid and arytenoid cartilages is second in importance in closing the laryngeal lumen in sperm whales. The fibers of the muscle, which start on the internal surface of the thyroid cartilage plates, converge aborally and are muscularly attached to the bodies of the arytenoid cartilages from their bases to about the middle of their height. Among the other muscles that constrict the laryngeal lumen of the sperm whale, we should mention the transverse arytenoid and aryepiglottic muscles, which are relatively poorly developed on the preparations we examined and are apparently synergists of the palatopharyngeal and arytenothyroid muscles (Figure 2).

The segment of the laryngeal cavity, in the form of a slit, from the aditus to bases of arytenoid cartilages should be considered as the top layer or vestibule of the larynx (vestibulum laryngis). It has the appearance of a narrow fissure, into which the tall medial fold of the epiglottic mucous membrane enters from the ventral side. In its aboral part, the fold consists of elastic cartilage, and for this reason it was a W-shaped form on frontal section of the epiglottis, and its median notch strengthens the airtight closure of the laryngeal vestibule (Figure 3).

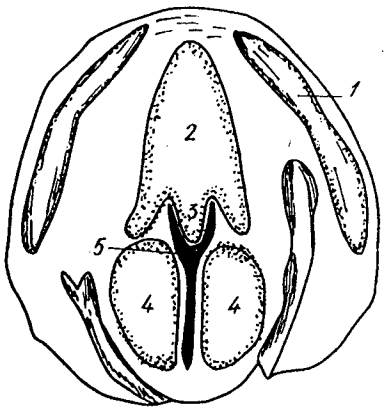

Figure 3.
Frontal section of sperm whale larynx at level of epiglottic base
1) thyroid cartilage
2) epiglottis
3) W-shaped medial fold
4) arytenoid cartilage
5) cavity of larynx

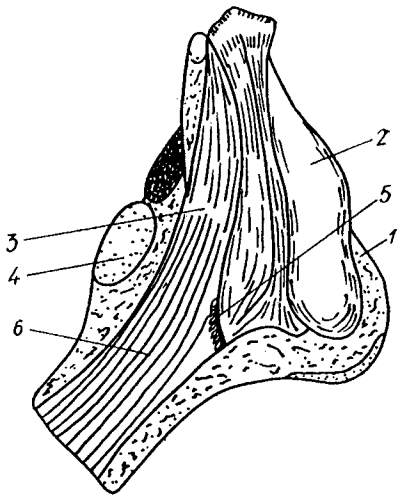

Figure 4.
Laryngeal cavity of sperm whale
1) thyroid cartilage
2) epiglottis
3) arytenoid cartilage
4) cricoid cartilage
5) vocal fold
6) mucosal fold

The caudal canal of the vestibule widens and changes into the rima glottidis. The latter is divided into a membranous part, which is between the vocal folds, and interchondral part, which is situated between the caudal processes of the arytenoid cartilages. The vocal folds are very short, rigid, covered with flat, stratified, uncornified epithelium and, in the sperm whale, consist of bundles of dense connective tissue formed mainly by collagen fibers with a small amount of elastic elements (Figure 4). The anatomy of the vocal folds, as well as complete absence of vocal muscle, in the specimens studied raises doubt as to the possibility of vibration of the vocal cords under the effect of an air current. We should add that, as is the case for other cetaceans (Manger, 1974), Physeteridae are characterized by significantly larger interchondral part of the rima than the ligamentous one (1:12, 1:14), which limits the capacities of the larynx as a sound-producing organ.

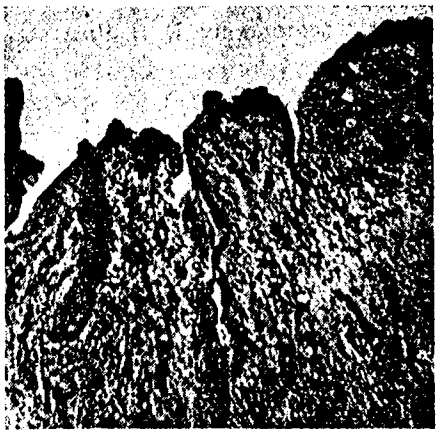

Figure 5.
Excretory ducts of tubular glands in laryngeal mucosa of sperm whale (microphotograph, lens 40×; eyepiece 10×; hematoxylin-eosin stain)

The surface of the subepiglottic cavity of the larynx (cavitas infraglottica) is riddled with numerous small fossae into which open the excretory ducts of tubular glands (Figure 5). The glands alternate with densely arranged lymphatic follicles. There is a great abundance of blood capillaries. Thus, deep in the ventral wall of the infraglottic cavity of the sperm whale larynx there are large accumulations of lymphatic and glandular elements. In the opinion of some researchers (Yablokov, 1972) the function of these structures is to neutralize the toxic impurities contained in inspired air. Somewhat more caudally, in the region of the passage into the trachea, the mucous membrane together with the submucosal layer forms 7 to 12 resilient parallel folds that do not open up, in the depressions between which there is also a profusion of lymphoid follicles and blood capillaries.

In assessing the adaptive distinctions of laryngeal structure in Physeteridae, we must mention the accentuation of anatomical elements (powerful development of palatopharyngeal sphincter and arytenothyroid muscle, presence of a medial epiglottic fold that tightly seals the vestibule, intranostril location of entrance to larynx, etc.), which have reflex-closing or protective function for the larynx as the phylogenetically oldest function of this organ. This is quite understandable, since sperm whales being teuthophagous must catch and swallow their prey at depths of up to 1000-1500 m. At the same time, the rigidity, minimal stretchability and shortness of the vocal folds, combined with the significant prevalence of the interchondral part of the vocal rima over the ligamentous one and absence of vocal muscle, hardly warrants consideration of the sperm whale larynx as a sound-producing organ of relevance to

animal communication processes. In this regard, one should apparently concur with the opinion of A. A. Berzin (1971) who believes that the main source of sounds in Physeteridae are anatomical substrates in the region of the unpaired nostril and frontal membranous sac, which have been little-studied as yet.

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CHRONIC ALCOHOLISM AND INTERNAL DISEASES

Moscow KLINICHESKAYA MEDITSINA in Russian No 12, Dec 84 (manuscript received 17 Apr 84) pp 23-29

[Article by Ye. Ye. Sigulya]

[Text] The urgency of investigating somatic manifestations of chronic alcoholism for clinicians is unquestionable. Chronic alcoholism has changed from a psychiatric to a general medical problem [1]. The increased interest of internists in the problem of chronic alcoholism in recent times is related to data concerning the important role of ethanol in development of lesions in many organs [3]. Bernitzki et al. [5], who screened 460 people, established that 20% were latent alcoholics, 47% consumed alcohol regularly every day, 50% drank occasionally and only 2% did not drink at all. A screening of 481 patients who visited a polyclinic in one of the districts of Leipzig (GDR) revealed that 16.2% of them abused alcohol regularly, and young patients constituted 42.5% of all those examined [5].

According to the data gathered by Gherlock [4], the amount of alcohol, scaled to 100% ethanol, per person per year constitutes 16.4 ℓ in France, 14.1 ℓ in Portugal, 14.0 ℓ in Italy, 11.3 ℓ in FRG, 11.7 ℓ in Spain and 4.8 ℓ in the Netherlands; mortality due to cirrhosis of the liver constitutes 57.2, 55.1, 52.1, 39.6, 38.8 and 7.4, respectively, per 100,000 people over 25 years old. Some authors consider 60 g/day for men and 20 g/day for women as the top limit of alcohol that does not yet cause development of cirrhosis when consumed regularly; the danger of liver damage depends on the dose of alcohol, and its regular intake is considered more dangerous than periodic intake in the same doses.

The role of alcohol in carcinogenesis has not been sufficiently determined. It was only found that there is a higher incidence of cancer of the mouth (other than the lips), pharynx, larynx and esophagus among chronic alcoholics, particularly young people [4]. The risk of cancer of the mouth is 10 times higher among those who abuse alcohol than nondrinkers, and if the former also smoke, the risk increases by 15 times. Overall mortality due to cancer of all localizations is 25% higher among alcoholics than the average for the general population. It was demonstrated experimentally that the main metabolite of ethanol, acetaldehyde, can elicit chromosome damage in a culture of human cells. Thus, alcohol is viewed as a syncarcinogen. The possibility cannot be ruled out that alcoholic beverages may contain chemical carcinogens.

Thus, traces of nitrosamines, propanol, methylbutanol and polycyclic hydrocarbons have been found in alcoholic beverages. Alcohol, which is a good solvent, helps carcinogens penetrate into tissues. Since ethanol activates various microsomal enzymes, it can be instrumental in biological transformation of procarcinogens into obligate carcinogens, mitogens and teratogens. Thus, one-third of the children with congenital deformities or mental disorders were born to mothers who abused alcohol.

In 1972, the term, "fetal alcoholic syndrome," appeared in the foreign literature. The possible deleterious effects of maternal alcoholism on the fetus could be manifested by low infant birthrate, small volumes of the head and brain, diminished intelligence, behavioral disturbances, hypoactivity, tremor, irritability, high intrauterine and neonatal mortality rate [4]. If a woman consumes 10 g ethanol per day, there is 10% decrease in fetal growth. The risk of miscarriage and neonate death rose, even if an alcoholic woman consumed 30 g ethanol twice a week. In Sweden, it was established that abstaining from alcohol in the 5th-12th week of pregnancy eliminates retarded fetal growth, but does not improve parameters of brain development, since it is expressly at this time that the embryo brain is sensitive to alcohol. It may be that damage to the liver and insufficient maternal nutrition are responsible for fetal pathology, since they are associated with penetration of large amounts of acetaldehyde into tissue, which disrupts the amino acid balance, whereas alcohol-induced hypoglycemia is instrumental in irreversible damage to the fetal brain.

Cushing's pseudosyndrome often develops in alcoholics; when alcohol intake is stopped, this syndrome regresses, but recurs with renewed alcohol abuse. With excessive intake of alcohol there may be development of the reversible syndrome of insufficiency of the hypothalamus-hypophysis-adrenal cortex system. Clinically, it is manifested by absence of reaction to stress, and the reaction to cortisol is attenuated or absent.

In the presence of liver damage, alcohol increases accumulation of iodine in the thyroid and its clearance. This is associated with altered metabolism of thyroid hormones due to low activity of hepatic enzymes. Alcohol intake leads to more intensive excretion in urine of calcium and magnesium; when taken regularly, hypocalcemia is not uncommon. Alcohol stimulates excretion of calcitonin [4]. In alcoholics with liver damage, there is usually an elevated growth hormone level; sometimes the reaction to a glucose load is paradoxical, and so is the one for arginine, glucagon and L-dopa. Alcohol intensifies insulin secretion with a glucose load or with administration of tolbutamide. Regardless of existing damage to the liver, alcohol can elicit severe hypoglycemia, which could explain the cases of sudden death after excessive alcohol intake. However, alcohol can also cause hyperglycemia as a result of stimulation of gluconeogenesis by adrenergic mechanisms.

Alcohol inhibits the supraoptic and hypophyseal systems, and this is associated with decreased excretion of adiuretin, which explains the profuse diuresis after intake of large doses of alcohol.

The syndrome of testicular atrophy in alcoholics was described long ago. It was previously believed that a direct toxic effect on germ cells is inherent

in ethanol. Only after sex hormone metabolism in the liver was discovered was an explanation given for the hypogonadism and gynecomastia observed in alcoholics. A distinction must be made between the changes in the gonads caused by the direct effect of alcohol and secondary pathological processes as a result of alcoholic damage to the liver. Diminished libido is observed in 40-77% of the male alcoholics, even in the absence of marked changes in the liver, and in 66-90% of those suffering from alcoholic cirrhosis [4]; the incidence of testicular atrophy constitutes 10-50% and 30-75%, respectively. Atrophy of mammary glands was found in 75% of alcoholic women. Whether or not there is alcoholic damage to the liver, gynecomastia is observed in 3-66% of drinkers, alopecia is observed in 84% of the men and 44% of the women. Rapid decline of testosterone level was demonstrated in healthy subjects who took ethanol for several weeks in a dosage of 3 g/kg weight per day, and by the 22d day there was also decline of plasma luteinizing hormone level. Alcoholics do not demonstrate active elevation of luteinizing and follicle-stimulating hormone levels when stimulated with clomiphene, which is indicative of structural impairment of the hypothalamus.

Alcoholics often present acute and chronic forms of myopathy. The former is pathogenetically related to loss of enzymes of muscle cells, and there is elevation of plasma creatine kinase level. Acute alcoholic rhabdomyolysis has been described; the clinical signs are characterized by painful swelling of muscle groups and muscle weakness; myoglobinuria is demonstrable. In severe cases, there may be acute tubular necrosis of the kidneys and acute renal insufficiency. According to data in the literature, the incidence of this pathology is 0.8-22% [4]. Morphologically, there is fragmentation of muscle fibers, hyalin or granular degeneration of cytoplasm and swelling of mitochondria. With the chronic form, there is slowly progressing weakness and atrophy of proximal muscle groups, more marked in the thigh region. This form of myopathy is often associated with symptoms of alcoholic polyneuropathy. There is significant decrease in isometric contraction of muscles in most alcoholics. Ethanol lowers the resting potential of muscle membranes, probably by activating ATPase. Daily intake of 225 g ethanol leads to elevation of blood plasma creatine kinase level, decrease in contractile function of acto-myosin and in calcium content. Both forms of myopathy could regress if one abstains from alcohol. Subclinical forms of myopathies were rather common among screened subjects, and to demonstrate them one needs to assay creatine kinase. According to some reports, polyneuropathy was found in 49% of men and 40% of women with latent alcoholism [5].

Long-term alcohol abuse causes changes in the hemopoietic system. Marked macrocytosis of red cells was found in 89% of the people who consumed over 80 g ethanol per day; it did not revert to normal under the effect of folic acid, and it disappeared only after 3 months of strict abstinence from alcohol. Macrocytosis is encountered more often in alcoholic women than men (94 and 71%, respectively) [4]. There is reduction in number of bone marrow cells under the influence of alcohol. It presents necroses; regenerative capacity is diminished; incidence of megaloblastosis is 20-60%. Vacuoles are demonstrable in the cytoplasm or nuclei of erythrocyte and leukocyte precursor cells, and they disappear after 3-7 days of abstinence. More than 50% of the alcoholics presented giant sideroblasts in bone marrow, and their formation is caused

by impaired conversion of pyridoxine to pyridoxal phosphate. These changes can be corrected by administration of the latter. Leukopenia is found in 5% of the alcoholics.

We know of the tendency of alcoholics toward infectious diseases. Alcohol inhibits mobilization of granulocytes in the presence of infection. Chemotaxis is drastically depressed after intake of even small doses of alcohol; there is also functional impairment of macrophages. There is decrease in number of lymphocytes, particularly their T subpopulation.

As a rule, increased hemorrhages are observed in chronic alcoholics. Even in healthy subjects, alcohol intake leads to reduction in number of reticulocytes and thrombocytes, which could cause purpura and gastrointestinal hemorrhage. Thrombocyte count reverts to normal on the 2d-3d day of abstaining from alcohol, reaching a maximum on the 10th-14th day. Thrombocyte life span is shorter in alcoholics [4].

Clinicians are aware of the manifestations of alcoholic cardiomyopathy. Single intake of large doses of alcohol has an adverse effect on heart function. Morphologically, there is reversible mitochondrial swelling and dilatation of the sarcoplasmic reticulum. Even occasional moderate alcohol intake elicits latent signs of diminished cardiac function [4]. The cause of the wide individual differences in the heart's sensitivity to alcohol is not clear. There is no alcohol dehydrogenase in the myocardium proper, so that one can assume that alcohol has a direct toxic effect on the heart. On the other hand, it is known that the main metabolite of alcohol, acetaldehyde, diminishes cardiac function. Cases of acute alcoholic cardiomyopathy with lethal outcome have been reported in the United States, Canada and Belgium. A toxic effect is attributed to cobalt, which is used as stabilizer for beer foam. It causes loss of calcium in myocardial cells [4]. As a rule, alcoholic cardiomyopathy develops after 10 years of alcohol abuse. Clinically, there is edema, enlargement of the heart, tachycardia and elevated venous pressure. Stroke volume is low. There is also low ventricular contractility; G. P. Kazantseva reports on predominant damage to the right ventricle [2]. Alcohol cardiomyopathy may be associated with hyperkinetic, eukinetic and hypokinetic variants of circulation, the hyperkinetic one being demonstrable more often at the early stages and the hypokinetic one, at the stage of marked clinical manifestations [1]. This is associated with accumulation of triglycerides, which is indicative of diminished oxidation of fatty acids and their intensive esterification. There is decrease in mitochondrial respiration and in activity of enzymes that metabolize tricarboxylic acids. The earliest signs of disease are nonspecific: periodic arrhythmia and unpleasant sensations in the region of the heart; ECG and x-rays are not yet altered, and only echography and ergometry can reveal insignificant changes. As time passes, these changes become constant; there is progression of signs of insufficiency of both ventricles; hepatomegaly is often encountered. If the patients continue to drink to excess death occurs within 2-4 years. If they abstain from alcohol, the prognosis is considerably improved. The latter depends on the severity of irreversible changes. It was suggested to make a distinction between three clinical forms of alcoholic cardiomyopathy: classical, quasi-ischemic and arrhythmic [3]; the quasi-ischemic form is the most widespread.

Major deviations have been found in the nervous system of alcoholics. The frequently observed malnutrition, particularly an unbalanced diet (relative shortage of thiamin and increased intake of carbohydrates), causes functional impairment of the brain; thiamin therapy does not improve memory, although other symptoms--ophthalmoplegia, nystagmus, ataxia, apathy, sleepiness and inability to concentrate--are eliminated. The rapid regression of these symptoms is indicative of absence of structural lesions and prevalence of biochemical defects [4]. The clinical signs of these changes are quite diverse, ranging from insignificant, brief disorders to marked manifestations of dementia, and women are stricken more often than men (21 and 6.6%, respectively); the typical Korsakov syndrome was found in 20 patients. Among 130 alcoholics, cortical atrophy was demonstrated in 62% and enlargement of the ventricles in 33% [4].

Thus, we can discuss an entire spectrum of alcohol-induced brain lesions. Cortical disturbances are the direct effect of alcohol toxicity; subcortical disturbances are due to thiamin deficiency. The correlation between clinical signs and morphological changes is not always clear enough. Abstinence from alcohol leads to some improvement of clinical manifestations [4].

There is much information in the literature about the harmful effect of alcohol on digestive organs. A direct link was established between the amount of alcohol consumed and development of chronic pancreatitis. Alcoholic damage to the pancreas is in second place in incidence, after alcoholic hepatopathy [3]. Women suffer from this disease more often than men and their alcoholic history is shorter (11 and 18 years, respectively) [14]. In the presence of alcoholic pancreatitis, a fatty liver and periportal fibrosis are often seen. The clinical signs of pancreatitis are characterized by recurrent pain in the epigastric region irradiating to the back. Later on, there is development of symptoms of impaired absorption from the intestine. One-third of the patients have diabetes, and in the others there are pathological changes in results of glucose tolerant tests. One may also observe signs of obstructive jaundice due to compression and edema of the pancreas. The icterus is recurrent and often associated with pain. Occasionally, cysts and fibrosis develop; in such cases, icterus becomes constant. Cholangitis is often associated with it. Among the complications, we should mention pancreatogenic ascites, exudative pleurisy and pericarditis; for differential diagnostic purposes, one can measure amylase and lipase in exudate. Occasionally, there is development of thrombosis in spleen veins, subcutaneous necrosis of fatty tissue, polyarthritis with fever and eosinophilia. Less often one observes intramedullary necrosis of fatty tissue in bones, which are demonstrable on x-rays as sites of osteolysis. The prognosis is very serious; in most cases, there is development of weight loss, steatorrhea and calcification of the pancreas. In two-thirds of the patients, death occurs within 15-20 years, and in over 40% of the cases it is due to complications.

Alcohol leads to rapid accumulation of fat in liver cells. Lipogranulomas consisting of histiocytes and epithelioid cells form around the droplets of fat. Occasionally they are so large that differential diagnosis is difficult (sarcoidosis?) [4]. In rare cases, there is development of droplet adiposity and, as a consequence, acute cholestasis with signs of inflammation and proliferation of bile ducts. Acute alcoholic hepatitis is characterized by fever,

icterus, vomiting and diarrhea; there may be symptoms of delirium as a sign of precoma. A significantly enlarged liver is demonstrable, which is tender to palpation; the spleen is not enlarged. There is rapid development of ascites. The blood shows leukocytosis and macrocytosis, elevation of levels of aminotransferases, alkaline phosphatase, γ-globulins, cholesterol, decline of albumin and potassium content [4]. Sudden death occurs frequently as a consequence of fat embolism and/or hypoglycemia. Gastrointestinal hemorrhages and portal hypertension are also frequently seen. Assay of glutamyl transpeptidase is a valuable diagnostic test, since its level is drastically elevated with this pathology [4].

Early alcoholic changes in the liver are quite reversible, provided there is abstinence from alcohol. A proper diet, rich in potassium and vitamins, is recommended. In very serious cases, one can also prescribe steroid hormones, but many authors do not observe much benefit from them. One can use D-penicillamine and colchicine to attenuate fibrosis, although their use is associated with side-effects.

The Mallory-Weiss syndrome (laceration of the mucosa in the region of the cardia with bloody vomiting) is often seen in alcoholics. Such individuals also often have cancer of the esophagus [4]. In addition, when there is diminished function of Oddi's sphincter, conditions are created for reflux of bile, contents of the duodenum and bacteria into the pancreas, which is instrumental in onset of pancreatitis [6].

Many authors believe that there is an independent nosological form, alcoholic gastritis. Thus, Palmer discovered erosions, petechial hemorrhages and focal hyperemia of the gastric mucosa using gastroscopy in 30 out of 34 men following acute alcohol abuse; these changes disappeared after 3 weeks of abstaining from alcohol. There are many data indicating that alcohol impairs the barrier function of the gastric mucosa. For example, there is decrease in transmural differences in potentials, which is an indicator of impairment of barrier functions, 3 min after intake of 25-40 mℓ whiskey; recovery is observed within 1 h. Alcohol causes reverse diffusion of hydrogen ions into the gastric mucosa; it elicits additional intensive loss of protein from the mucosa, which is due to increased desquamation of cells. In spite of the popular opinion, some authors believe that there is no convincing evidence to confirm the higher incidence of peptic ulcers and gastrointestinal hemorrhages in individuals who drink to excess [4]. However, such a pattern was found in the case of combined intake of alcohol and aspirin [4].

Alcohol has a direct effect on morphology and function of enterocytes. There is a small amount of alcohol dehydrogenase in the small intestine, and it has no appreciable effect on metabolism in the intestine. Chronic alcohol intake leads to similar ultrastructural changes in small intestinal cells as are typical of alcoholic damage of the liver [4]. This could be attributed to low concentration of oxygen and ATP, as well as reduction of intestinal enzymes. This also explains the decrease in glucose and xylose transport, while the decrease in Na-K-ATPase elicits decrease in amino acid transport through the enterocyte membrane. There is diminished absorption of fluid, sodium and chlorides in alcoholics; however, this could also be due to a folic acid deficiency and malnutriton, which are inherent in this category of individuals.

It has been demonstrated experimentally that alcohol reduces formation of intrinsic factor in the stomach, which leads to impaired utilization of vitamin B_{12}, which cannot be corrected by prescribing folic acid and a high-protein diet. Alcohol stimulates adenylcyclase and cAMP. This causes more intensive intestinal secretion of fluid and electrolytes, and causes diarrhea, which is common among alcoholics [4].

There are no convincing data in the literature concerning the effect of alcohol on the large intestine. Nor has it been proven that alcohol supposedly increases the incidence of cancer of the rectum [4].

Alcoholic nephropathy is characterized by several variants: toxic nephropathy, hepatorenal syndrome, chronic glomerulonephritis, urinary tract infection [3]. The first variant usually develops after excessive intake of alcohol. There is morphological demonstration of hydropic dystrophy, necrobiosis and necrosis of epithelium of the main branches of the tubules [3]. With the hepatorenal syndrome, one observes the clinical signs of hepatorenal insufficiency with a very poor prognosis. Chronic glomerulonephritis is combined with cirrhosis of the liver and manifested by hematuria [3].

This article has not covered the entire problem of pathology of internal organs with chronic alcoholism; nevertheless, it is obvious that, in this case, many viscera and the nervous system are stricken at the same time.

In conclusion, it should be noted that, in clinical practice, one often encounters diverse visceral pathology that could be due to the deleterious effect of alcohol. Alcohol abuse in itself is often concealed by patients, and for this reason it is necessary, in some cases, for internists and neurologists to gather a complete history in order to detect alcohol excesses, which would help make the correct diagnosis and administer adequate therapy.

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DRUG DOSAGE ERRORS

Moscow IZVESTIYA in Russian 6 Feb 85 p 6

[Interview by A. Pral'nikov with Mikhail Alekseyevich Klyuyev, director of the Chief Administration for Pharmacies of the USSR Ministry of Health: "No Right to Err"; date and place not given]

> [Text] "IZVESTIYA" No 341/342 for 1984 contained an article on "Operation 'Pharmacist's Error'". It told the story of how one of the Leningrad pharmacies made up and dispensed an overly-high dosage of a drug for use by a nine month old infant. The error was noticed after the child's mother had already left the pharmacy. The pharmacists gave the alarm and organized a search involving physicians, police, and thousands of Leningrad citizens. The events were also reported by radio and television.

Most of the envelopes arriving at the editorial office after the publication of this story were addressed in a profession hand (don't you agree that you can immediately spot the handwriting of someone who writes a lot every day?). Thus, the first to respond were those working in pharmacies. Almost every respondent was offended, and nearly everyone thought that the article should have been called "Physician's Error."

We asked M. A. Klyuyev, director of the Chief Administration for Pharmacies of the USSR Ministry of Health, to comment on the events in Leningrad and the letters to the editor.

[Comment] This is a very rare case. The system for making up and dispensing drugs calls for triple inspection, which practically eliminates all error. Bur an error did occur. Those guilty include both the pharmacists and the physician, who wrote up the prescription incorrectly and specified an incorrect dosage.

Mistakes can happen on the part of both physician and pharmacist, and they cannot be justified. I would only like to state that such mistakes have not occurred (or at least we have not heard of them) for many years. And people come to our pharmacies in need of medicines, long after midnight, billions of times every year.

MAGNETOCARDIOGRAPH MORE SENSITIVE THAN EKG

Baku BAKINSKIY RABOCHIY in Russian 15 Feb 85 p 3

[Excerpt] Khar'kov--Scientists of one of the laboratories of the Ukrainian Academy of Sciences' Physical-Technical Institute of Low Temperatures offered to take my magnetocardiogram with a device which they developed for recording the magnetic fields of living organisms.

A glass-fiber plastic cryostat--a container with liquid helium--was brought up to within a few millimeters of the chest. The cryostat contained a measuring unit with the small receiving antenna of a magnetometer. A complex curve appeared on the recorder tape. As was explained by the physicists, the instrument's extra-high sensitivity is due to superconductivity, which occurs at a temperature of minus 269 degrees Celsius.

Medical specialists of the Khar'kov Cardiological Center collaborated with the institute.

"A living organism's organs and tissues, including the heart, generate magnetic fields during their vital activity," said Corresponding Member of the Ukrainian Academy of Sciences I. Dmitrenko. "The resulting cardiogram is, as it were, the magnetic 'voice' of the myocardium. The slightest nuances characterizing its function are recorded much more fully and accurately than with other methods of investigation. Therefore, the magnetocardiograph can be used both in the diagnosis of complex diseases of the cardiovascular system and in large-scale preventive medical examinations. The instrument's sensitivity is so high that it can record the heart contractions of a fetus at the earliest stages of its development."

Preparations for serial manufacture of this innovation are under way. Scientists are planning to study the possibilities of biomagnetography of other organs and tissues of the human body, especially the brain and muscles.

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The importance accorded to such inspection is shown by the fact that the day after the Leningrad event, the case was thoroughly investigated, One day after this, a joint order was issued by the Chief Administration for Public Health and the Pharmacy Administration of the Executive Committee of the Leningrad Soviets. It thoroughly examined the errors committed, dealt with how to punish those guilty, and instructed the chief physicians of polyclinics and directors of pharmacies to strengthen their inspection of prescription writing and drug dispensing.

[Question] Mikhail Alekseyevich, what type of error was committed by the physician?

[Answer] The principle error was to multiply the correct dosage by a factor of 10, evidently because he was not paying careful attention. But if he had written out the prescription on the proper form (children up to one year of age are given drugs for free and the prescription is filled out in two copies) the pharmacy workers would have had no doubt that the physician had accidentally written one zero too many.

[Question] But, as the Leningrad polyclinic informed our editorial staff, the physician did not have enough such forms that day; she was making house calls and had written prescriptions for many other youngsters. The child's mother did not want to wait until the following day and asked the physician to write out a paid prescription. The physician agreed.

The probability of error was rising.

The director of the Department of Technology of Medicines of Kazan Medical Institute, L, Potseluyeva, writes: "A prescription is a written direction (assignment) from the physician to the pharmacist to prepare a drug....The pharmacy worker should at least verify the drug dosage, the single and total daily doses.

[Answer] Yes, that's right. Also, in the case where the dosage proscribed is too high, the pharmacist should prepare half of the dose indicated, corresponding to the patient's age. This is done so that treatment might begin immediately.

[Question] Why didn't the pharmacy verify this prescription?

[Answer] The joint order which I mentioned above, states: "The pharmacist-technician, in violation of established order, accepted this prescription. The pharmacist pointed out to the drug dispenser who was verifying the correctness of the preparation procedure that the dose seemed too high, and requested that the age of the child be determined when the drug was handed out. A note was affixed to the packet of powders: "Do not dispense without verifying age." The dispensers, in changing shifts, did so formally, without any warning of a possible error. The technician in charge of verification mechanically signed the control slip and gave permission for the drug to be dispensed."

As you can see, the mistake was detected but, through carelessness, remained uncorrected. This case was investigated by the public prosecutor of the Petrograd rayon of Leningrad, who did not find anything criminal in the actions of the physician or the pharmacy inspector, and suggested that certain measures be taken to assure that such violations did not reoccur.

A serious lesson for us all, which has demonstrated that where human health is concerned one must be particularly carefulaand collected and not deviate an iota from established strict rules.

[Question] Some readers sent us letters suggesting that a special form be used for prescriptions intended for children up to five or seven years of age. For example, colored forms might be used which could immediately be spotted among the others, drawing attention to themselves. Do you find this reasonable advice, Mikhail Alekseyevich?

[Answer] I do not think that this suggestion, although good, will be implemented in the neat future. The thing is, we have enough problems as it is, with prescriptions forms of a type specified by the Ministry of Health printed on plain paper. There's not quite enough even of this plain paper.

But we are taking measures, anyway. I will quote the order, published after the event described in "IZVESTIYA", once more: "We must lable the prescriptions for children up to one year of age by underlining in red the inscription "For Children" in the top left corner.

We discussed what had happened in Leningrad and why only the issue of drug preparation in the pharmacy was involved here. I repeat, the inspection process is dependable. Everyone knows that we have a very careful system of drug inspection. The attention paid to the one and only error made in many years is additional evidence for this.

I will also mention inspection of the vast quantity of drugs already prepared by the industry in final form. These drugs also must pass a "multistage" inspection. Our country has a network of 300 inspection laboratories in which analysts study the chemical composition not only of every batch but of every series of drugs sent out to pharmacies. There is particularly strict inspection of drugs intended for use in preparing injections, eyedrops and certain other purposes.

In short, you can be certain that the expression "just like in a pharmacy" is completely applicable to pharmacies.

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HYPERBARIC THERAPY AND NEW MEDICAL PRESSURE CHAMBERS

Riga SOVETSKAYA LATVIYA in Russian 22 Jan 85 p 4

STAROSEL'SKIY, B.

[Abstract] The article recounts a visit to the hyperbaric oxygenation (GBO) department of the Moscow Oblast Clinical Scientific Research Institute imeni Vladimirskiy. A conversation with Sergey Kiselev, head of the department, is recorded. Kiselev responded to questions regarding the nature, status and prospects of hyperbaric oxygenation methods and equipment which are in use in the department and elsewhere in the Soviet Union. Kiselev mentioned some of the disorders for which hyperbaric oxygenation therapy has proved beneficial, including gas gangrene. The department uses Soviet-made pressure chambers which Kiselev says are equal in quality to foreign counterparts. Pressure chambers in production in the USSR are said to range from large operating rooms, capable of accomodating a whole surgical team, to portable apparatus of the "Irtysh" type, which can be easily transported to and assembled in places where they are needed. The "Irtysh" type can be used by geological expeditions in remote areas, for example. A resuscitation unit, the "Yenisey", is called the latest type of pressure chamber. It is said to be equipped for performing a whole complex of resuscitation measures, including artificial ventilation of the lungs, blood transfusion and intravenous feeding. Hyperbaric oxygenation's advancement as a field of clinical medicine is proceeding according to plan in the USSR, according to Kiselev. He says that the number of GBO departments and medical pressure chambers has been increasing substantially from year to year.

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UNIFICATION OF RESEARCH ON PULMONARY DISEASES

Moscow MEDITSINSKAYA GAZETA in Russian 4 Jan 85 p 3

KALITA, V., special correspondent, Kiev

[Abstract] In spite of great progress made in the area of pulmonary diseases at the Kiev Scientific Research Institute of Tuberculosis, Pulmonology and Chest Surgery, the scientists felt the need to expand their work. Combining their efforts with specialists of the Institute of Physics, UkSSR Academy of Sciences, they developed a thermographic unit for localizing pathological processes in lungs. The instrument is safe, giving rapid and reliable readings. Collaboration with workers of the Institute of Physical-Organic Chemistry led to development of a new stain for histologic preparations, staining selectively elements of connective tissue of the capillaries and erythrocytes. Combining their efforts with scientists of the Institute of Cybernetics, attempts were made to develop methods for collection, processing and analysis of data on blood flow and respiration of treated pulmonary patients. Manual methods are being automated. Such collaborations between medical staff and workers in other technical branches should lead to further improvement in health care delivery. There are still many organizational and even emotional problems to solve, however, before this idea will become a routine phenomenon.
[1751-7813]

UDC 616.98-022.38:579.842.11]-036.21

OUTBREAK OF FOOD POISONING DUE TO ENTEROTOXIC ESCHERICHIA COLI

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII
in Russian No 11, Nov 84 (manuscript received 14 Sep 83) p 114

DOLZHKEVICH, N. Ya., SLYUSARENKO, M. F., KUTOMANOVA, N. P., KHONDOGA, A. I., FEDOROK, N. F. and GOLOVNYA, L. G., Chernigov Oblast Sanitary Epidemiologic Station; Chernigov City Hospital

[Abstract] An outbreak of food poisoning occurred which afflicted 20 members of a family that had partaken of seared beef cutlets. The symptomatology and the clinical course followed a classical pattern with fever of 38-40°C, various abdominal pains, nausea, vomiting, and weakness. Escherichia coli O1 was isolated from the fecal specimens, with serologies demonstrating the formation of an antibody response against this serovar within 3-4 days of onset of illness. Over the next several days the antibody titers increased 4- to 10-fold. Confirmatory cultures could not be obtained from the suspect food, which was not preserved.
[258-12172]

MICROBIOLOGY

CHEMOAUTOTROPHIC BACTERIA REFINE ORE

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 9 Feb 85 p 4

[Article by L. Rodzinskiy]

[Excerpt] I held a bar of iron in my hand.

"It is chemically pure," remarked associates of the institute, not without pride. "We produced it ourselves from ore."

This was quite hard to believe since our conversation was taking place in the Institute of Biophysics of the USSR Academy of Sciences' Siberian Department. How could biologists produce iron?

"We have a whole metallurgical plant here," replied Doctor of Biological Sciences, Professor B. Kovrov. "Come on, I'll show you."

Instead of melting furnaces, glass cases stood along the wall of a room. In these cases were liquids of various colors, with thousands of tiny sparkling bubbles.

"These 'aquariums' all contain solutions of various metals. If a green solution is evaporated, for example, chemically pure iron is obtained," explained the scientist. Noticing my bewilderment, he added: "The whole secret lies in the fact that these metals in solution are given off by microorganisms."

Bacteria which the Siberian biologists are breeding in glass cultivators possess unique properties.

"They refuse to work in natural conditions," related B. Kovrov. "For active 'digestion,' they need a constant stimulator--an electric current. The vital activity of these bacteria--so-called chemoautotrophs--can be compared in essence with chemical reactions in which electricity acts as a catalyst."

Incidentally, it is by no means obligatory to erect buildings for these unusual metal factories. An ore deposit can be pierced with boreholes, and explosives can be placed in them and detonated so that the ore body is covered with numerous cracks. Solutions containing chemoautotrophs with 'individual tastes' can then be pumped into the boreholes. When the solutions encounter

the ore, first bacteria that have a taste for zinc, for example, 'eat their full.' All that remains to be done is to pump this zinc solution to the surface, extract the metal, and then put bacteria that specialize in copper to work. And so it goes until all valuable metals have been extracted. The method proposed by the scientists is particularly effective for polymetallic ores.

The poorest deposits and even tailing dumps of various ores in which useful components remain can be refined in approximately the same manner. And harmful, environment-polluting oxides of iron, aluminum, chromium, nickel and other elements can be removed from industrial enterprises' sewage by putting bacteria into it.

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NUTRIENT MEDIUM FOR DETECTION OF METALLIC SHEEN ON PSEUDOMONAS AERUGINOSA COLONIES

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 11, Nov 84 (manuscript received 20 Dec 83) pp 26-33

KALINA, G. P., Moscow Scientific Research Institute imeni F. F. Erisman

[Abstract] Studies were conducted for the selection of optimum medium for the detection of metallic sheen on Psedomonas aeruginosa colonies, for the possible use of this trait for diagnositic purposes. A medium was designed which yielded virtually 98.3% sheen formation on macrocolonies, consisting of a meat-peptone agar base (100.00 ml), milk (10.0 ml), peptone (1.0 g), L-arginine HCl (0.3 g), and 2,3,5-triphenyltetrazole chloride (0.8 g). Addition of the supplemental peptone and arginine accelerated sheen formation, with recommendations that the Petri dishes be examined after 40-42 h of incubation at 37°C. In the absence of triphenyltetrazole sheen formation was evident only in ca. 70% of the colonies. Sheen formation by Ps. aeruginosa colonies can, therefore, be regarded as a diagnostic trait on the appropriate medium. Figures 5; references 28: 3 Russian, 25 Western.
[258-12172]

UDC 579.862.1:253].083.12

FAILURE OF SALMONELLA TYPHI AND S. GALLINARUM TO GROW ON SIMMONS CITRATE AGAR BECAUSE OF TRYPTOPHAN AUXOTROPHY

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 11, Nov 84 (manuscript received 27 Oct 83) pp 33-36

DOMBROVSKIY, A. M., RADAKOVA, Ye. D. and KLUSHINA, T. N., 2nd Moscow Medical Institute imeni N. I. Pirogov

[Abstract] Studies were conducted on the metabolic correlates of Salmonella typhi and S. gallinarum in relation to their failure to grow on Simmons citrate agar (SCA). S. typhi was found to exhibit tryptophan auxotrophy and was

incapable of utilizing sodium citrate (sole carbon source in SCA) as a source of carbon, whereas S. gallinarum--also auxotrophic for tryptophan--could utilize sodium citrate. Enhancement of the mineral medium with glucose, tryptophan, cysteine and methionine favored the growth of S. typhi, but not of S. gallinarum. In the final analysis, the inability of S. typhi to grow on SCA was ascribed to its inability to utilize sodium citrate as the sole source of carbon. However, S. gallinarum grew on mineral media supplemented with tryptophan and sodium citrate. The failure of S. gallinarum to grow on SCA appears to be due exclusively to its failure to synthesize tryptophan. Figures 1; references 8: 3 Russian, 5 Western.
[258-12172]

MILITARY MEDICINE

ATTITUDES TOWARD NEW MILITARY RECRUITS

Moscow ZDOROV'YE in Russian No 2, Feb 85 p 1

[Interview with Fedor Ivanovich Komarov, Maj Gen Med Serv, Chief of Central Military Medical Administration, USSR Ministry of Defense]

[Text] [Question] Twice a year, in the spring and fall, new recruits arrive in army subunits ["podrazdeleniye"] and board ships of the Navy. The safety of our homeland and stability of its frontiers depend on the extent to which young men are prepared for military service, what kind of soldiers they become. Fedor Ivanovich, please tell us how service in the army benefits young people.

[Answer] It suffices to see just once a formation of new recruits and long-time servicemen to become convinced that a young man does not spend 2 years in the army in vain. The mother of a soldier who accompanied her son to the service will agree with me that he returned home as a grownup, having matured both physically and morally. A young man starts to serve in the army at precisely the time that he becomes a personality. This is of necessity taken into consideration in the educational and rearing work of commanders and political workers. For this reason, even the most disorganized men, poorly prepared for army service very soon become disciplined and skillful soldiers, who are industrious and exacting of themselves and their comrades.

Army service inculcates a sense of collectivism, readiness to rescue one another. These traits will become a reliable foundation for all future life, but they are acquired and refined in the subunit, where all members of the group, from private to commander, solve common problems, work and rest together, engage in sports.

In the army, each soldier acquires a certain specialty. And, after they are transferred to the reserve, for some of them the occupation of, for example, driver, radio operator, mechanic, will remain as their life's career. Not to mention the other work skills that are developed in the army. Life, particularly during marches, under field conditions, at exercises, compels the soldier to learn how to cook, clean a room and, sometimes, mend his clothing.

[Question] I should like you to dwell in greater detail on the role of the family, school and work groups in preparing a young man for military service.

[Answer] It is stated in the USSR Constitution that "Defense of the socialist homeland is the sacred duty of every USSR citizen." Preparation of young men to perform this sacred duty begins in the ninth grade, in accordance with the USSR law, "Universal Military Duty." Early military training takes place in schools, tekhnikums and polytechnic institutions. Young men with deviations of physical development and health status are picked up in the course of dispensary observation. Dynamic medical supervision is instituted for them. If necessary, a set of therapeutic and health-improving measures are applied. When a young man reaches his 17th birthday, he is assigned to his recruiting district, where he appears before a medical commission. In the summertime, young men are sent to military sports and sports-health-improving camps. In addition to physical culture, applied military and technical forms of sports, health-improving measures are administered there.

At the age of 18, young men are subject to call-up for active military service. Again they undergo medical certification to ascertain their fitness for military service and determine the type of troops in which they can serve.

The family, pedagogic and work groups can and must provide substantial help for the future recruit in preparing him for the difficult army life.

Parents and teachers should not baby him and protect him against physical loads; on the contrary, they should inculcate love for sports and encourage in every way participation in sports sections.

It happens that some parents convince their son that he is weak and sick to such an extent that the lad is even apprehensive to engage in morning exercises for the first few days in the army.

But parents should be concerned with more than strengthening health. Since time immemorial, mothers have taught their sons to love their homeland and sent them to defend it. And it is expressly the mother who should be first to convince the future soldier of the great responsibility b eing placed on his shoulders. How sacred his military duty is!

[Question] But a mother remains a mother.... And she worries when her son leaves home for the first time and for a long period. Are her worries justified?

[Answer] For parents, children will always be their children, even long after they have grown beyond childhood. As a military physician, I should like to reassure mothers and fathers: my many years of experience justify the statement that military service has a beneficial effect on health and physical development of young men.

They receive a proper diet, a good quality of clothing, shoes and they have good housing. All aspects of life of servicemen, their working and recreation conditions are also under the control of military physicians. In addition, troop physicians constantly monitor the health status of servicemen.

Special attention is devoted to safeguarding the health of young soldiers, since the early stage of service in the army is the most difficult for them.

For this reason, a system of measures has been developed in both the army and navy, which are aimed at overcoming the difficulties of the adjustment period. Young soldiers learn the fundamentals of military affairs gradually, under the supervision of medical workers in military units ["chasti"]. The physical and mental loads are adjusted in accordance with medical recommendations. If necessary both officers and privates can always receive highly qualified medical care.

The conditions presently provided for servicemen in the army have provided the highest indicators of health status of Armed Forces personnel over the postwar period.

Good luck in your service, young soldiers, for the good of our socialist motherland.

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PHARMACOLOGY AND TOXICOLOGY

LIVING INTERFERON FACTORY

Moscow ZDOROV'YE in Russian No 2, Feb 85 p 11

[Article by O. Zedayn]

[Text] Who among us has not had to resort to an agent contained in a small vial with the label, "human leukocytic interferon"? The physician prescribes this drug when we have influenza, upper respiratory viral infection....

This agent is produced from leukocytes of donor blood. And a liter of donor blood is needed to recover one dose! As graphically expressed by Academician Yu. A. Ovchinnikov, director of the Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, the blood of even all mankind would not be enough to satisfy the demand for interferon. Particularly since this demand will grow constantly. Where then are we to obtain the needed amount of interferon?

Gene engineering, a technique that permits transplantation of genes (segments of DNA that control synthesis of a specific protein) from one species to another, has come to the rescue. In this instance, scientists decided to splice the human gene responsible for synthesis of leukocytic interferon to the DNA of E. coli.

"It is not at all by chance that this bacterial cell was selected for work in gene engineering," says Yevgeniy Davydovich Sverdlov, laboratory chief at the Institute of Bioorganic Chemistry. "In the first place, microbiologists have always been keenly interested in it, and for this reason, the colibacillus as a whole and its genetic system in particular have been studied far and wide, as they say. In the second place, E. coli is very unpretentious. It does not require any special conditions to develop and multiply (for example, special ambient temperature, specific pressure are not required), and inexpensive raw materials serve as its nutrient medium. Finally, in studying E. coli, specialists determined that it is capable of acquiring resistance to some antibiotics, by making "improvements" in its own genetic system. As it was learned, this mechanism is related to mutations (changes) in plasmid DNA, which is a circular molecule that "floats" in the cell's cytoplasm. And so it was decided to splice the gene of leukocytic interferon into plasmid DNA.

For this, experimentors first had to extract plasmid DNA from E. coli and, using special enzymes--restrictases--cut it at the required spot. Thus

from a circular molecule they obtained a linear one. Now the ends of this "ruler" had to be joined, again resorting to the help of enzymes, to the ends of the gene that codes synthesis of interferon. This worked too. As a result, a new circular DNA was obtained, which is called recombinant.

But splicing the gene was only half the job. For it to function in the cell rather than merely be there, it has to be equipped with regulatory elements. After all, along with genes, in which is inscribed the program for synthesis of some protein, there are also unique triggering mechanisms in the DNA system, which control gene function. They turn on the required gene when the cell needs a particular protein and turn it off as soon as the need is satisfied.

The task was also complicated by the fact that a regulator had to be found for interferon that would compel the cell to produce a large amount of this protein. Gene engineers had to work for a long time to design and manipulate with various regulating elements before they finally obtained the desired result: the productivity of the live factory was significantly increased. At present, almost 5000 times more interferon is recovered per liter of bacterial suspension than from a liter of donor blood.

Experimental production testing of the latest producer strains revealed that they function well under plant conditions and provide for high yields of interferon. In only 1.5 work shifts one can produce up to 5 million doses of interferon. And to recover the same number of doses from human leukocytes, 25 million donors would have had to give blood!

The achievement was obvious. However, it is still too soon to speak of introduction of interferon produced by E. coli to clinical medicine. The product obtained by such an unusual route requires serious clinical trials. Work is continuing....

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INTERFERON--WEAPON FOR SELF-PROTECTION

Moscow ZDOROV'YE in Russian No 2, Feb 85 pp 10-11

[Article by V. D. Solov'yev, academician of the USSR Academy of Medical Sciences]

[Text] Interferon, which was discovered a little more than 25 years ago, immediately attracted the attention of scientists. Virologists, immunologists, cytologists, biochemists and, more recently, oncologists, specialists in gene engineering and pharmacists became interested in it and began to study it intensively. Such close interest on the part of specialists in this agent was due primarily to its unusually high antiviral activity.

Interferon is a protective protein that the body's cells start to produce within hours of invasion of any genetically foreign agents (antigens), for example, foreign proteins and nucleic acids. But they synthesize interferon with particular intensity when viruses penetrate into the body. And, unlike such protective agents as antibodies (produced only by cells of the immune system), which have strictly selective action and, while protecting the body against one virus they are utterly helpless against another one, interferon is not specific, it is universal.

Interferon does not come into contact with a virus and does not have a direct neutralizing effect on it. Incidentally, it is for expressly this reason that viruses cannot adapt to interferon or develop resistance to it. The purpose of interferon is to strengthen the defense capability of cells. This goal is reached by affecting the membranes of both the cell that secreted it and adjacent cells. As a result of contact between interferon and receptors built into the membrane, substances begin to be produced in the cell that depress viral reproduction and the viral attack is bogged down.

These unique properties of interferon compelled specialists to view it as a potential agent for protection against viral diseases. Man is presently threatened by about 500 different viruses capable of producing acute and chronic diseases, including autoimmune ones, and malignant diseases. It is virtually impossible to develop an effective vaccine against each of these viruses. First of all, it is because viruses undergo mutations, recombinations and other changes quite readily. This means that while a weapon is being prepared against a specific virus, it has time to change its "image"

and its properties to such an extent that a given vaccine or some other drug will be useless against it. This, incidentally, explains why it is impossible to develop effective enough drugs against the viruses that cause influenza. And only interferon (of the presently known agents) does not act selectively against some virus, but takes on the defense of the body's cells against any enemy. The potential potency of interferon is remarkable; one of its molecules is capable of protecting several thousand (!) cells against viral infection.

A valid question arises: If the power of interferon is so great, why do we get sick anyway? Why, let us say, do some people remain healthy during an influenza epidemic, even in large cities with a very high population density, while others get sick, recover rapidly and without complications and others yet are seriously ill for a long time?

There is still no exhaustive answer to such questions. Today, we are generally much better informed about the causes of onset and mechanisms of development of diseases than about what provides resistance and enables us to remain in good health in spite of exposure to adverse environmental factors. For example, more than 100 viruses have been isolated from the human respiratory tract alone and investigated, but we still do not know why their penetration into the trachea and bronchi of some people is associated with disease and occurs without a trace in others. Most often children up to 3 years old and adults over 60-65 years of age are stricken by influenza and its complications. We have determined that interferon productivity of cells is low in these age groups. But even people in the same age group react differently to contact with influenza viruses.

Of course, individual constitutional distinctions, which also leave their mark on immunity, are not the last in significance. In one person, defenses are powerful and cells produce sufficient amounts of interferon. In another, defenses are weak and much less interferon is produced than is needed. This is why scientists are searching for agents that would force cells to produce more of their own (it is called endogenous) interferon. Methods have also been developed for recovery of interferon from human blood leukocytes. It is called exogenous, i.e., originating from the outside. Specialists have learned to remove inert proteins from it and recover concentrated, highly active interferon. This agent is used with success as a therapeutic and preventive drug.

At present, it has been firmly established that exogenous interferon is quite effective in the control of such a widespread disease as hepatitis B. When it is given many times to a patient, he is entirely cleared of hepatitis virus. This means that a person ceases to be a carrier of hepatitis virus and source of infection for people around him. Satisfactory results have been obtained in treatment of patients with herpes of mucous membranes and skin, other skin diseases, as well as diseases of the upper respiratory tract of viral origin.

Investigations have revealed that interferon has an effect on cells stricken by pathogens, in particular, malignancy (for example, leukemia), both in experiments and clinical practice. Such data were obtained in many Soviet and foreign laboratories, and they are not questioned. This was borne in mind in studies of the therapeutic effect of interferon on malignant neoplasms. In

recent years, together with specialists from the All-Union Oncological Research Center, USSR Academy of Medical Sciences, we have been studying the effect of interferon on children with leukemia. The results are encouraging; however, it is premature to speak of the efficacy of interferon in oncological practice. Considerable effort on the part of specialists and time will be required. But even if interferon lives up to only part of the expectations justifiably placed on it, it would open up new horizons in the prevention and treatment of viral and neoplastic diseases.

At the present time, more and more new data are being gathered about interferon, its antiviral and immuno-simulating properties. Very recently it was believed that we were dealing with one substance, regardless of what cell produced it. But now it has become clear that this is not so. At present we know of an interferon produced by leukocytes. It is called alpha-interferon, while the one produced by connective tissue cells is called beta-interferon, and by lymphocytes, gamma-interferon. Does this mean there are three types of interferon? Let us not be hasty with an answer. As we know, the structural plan for each protein is inscribed in its own gene, a specific segment of the DNA (deoxyribonucleic acid) molecule responsible for integrity and transmission of genetic information. It was found that there are more than 12 interferon genes in the nuclear DNA of leukocytes, up to 5 in the DNA of connective tissue cells and even less in the DNA of lymphocytes). This means that, if necessary, cells can synthesize up to 12 alpha-interferons, 5 beta- and 3 or 4 gamma-interferons. No doubt it is not by chance that such a diversity was needed by the body and there is no doubt that they must differ functionally in some way. How? In order to answer this question, scientists deployed a wide front of research, and their very first results enabled them to conclude that they are searching in the right direction. Thus, it was learned that gamma-interferon is much more potent than leukocytic, in its effect on tumor cells. I think that it has an extremely promising future, particularly in oncology.

However, this does not exhaust the list of questions related to interferon. I have already mentioned that specialists have learned to produce a concentrated preparation free of inert proteins. Greater activity should also have been expected of it. But here is a paradox: in some cases the purified interferon has less effect than unpurified.

Recently, at the Institute of Epidemiology and Microbiology imeni Honorary Academician N. F. Gamaleya, a series of experiments was conducted, in which the effect of leukocytic interferon on staphylococcal toxin was investigated. And what were the results? Small doses of a "dirty" unpurified interferon preparation neutralized the action of this toxin. But the purer it was, the larger the dose required to obtain the same result. This suggested to the experimenters that interferon does not act alone in the body, but in conjunction with other substances, in particular, so-called leukins, which are being investigated more and more closely in both our country and abroad.

There is no doubt whatsoever that, in the near future, in-depth studies of interferon will enrich our knowledge about the mechanisms of regulation in cells and in the body as a whole, as well as expand the therapeutic and preventive capabilities of clinical medicine.

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NEW GENERATION OF ANTIBIOTICS

Moscow ZDOROV'YE in Russian No 2, Feb 85 pp 8-9

[Article by S. Kharlamova]

[Text] The 1984 USSR State Prize was bestowed upon the following for development of the scientific bases, technology and industrial implementation of biocatalytic processes for recovery of key compounds for production of betalactam antibiotics: S. M. NAVASHIN, academician of the USSR Academy of Medical Sciences, director of the All-Union Scientific Research Institute of Antibiotics and chief of project; YU. E. BARTOSHEVICH, candidate of biological sciences, deputy director; YE. M. SAVITSKAYA, doctor of chemical sciences, former laboratory chief; M. M. LEVITOV, doctor of biological sciences, scientific consultant; P. S. NYS, candidate of chemical sciences, senior scientific associate; S. S. SMIRNOVA, deputy chief of shop at experimental plant, and to employees of the same institute: A. I. KESTNER, doctor of engineering sciences, department head at Tallin Polytechnic Institute; N. M. MATOKHINA, chief engineer at the Riga Medical Products Plant; YU. N. MILESHIN, candidate of engineering sciences, deputy chief of laboratory at the Saransk Medical Products Plant; V. K. SHVYADAS, candidate of chemical sciences, senior scientific associate of interfaculty scientific research problem laboratory of molecular biology and bioorganic chemistry at Moscow State University imeni M. V. Lomonosov.

Through the efforts of scientists and practical workers, a new generation of antibiotics was born, which have broader spectrums of action. They can, in particular, depress some species of so-called Gram-negative microbes and even staphylococci. And, what is very important, the new antibiotics have virtually no side-effects and do not elicit allergic reactions.

These products were developed by means of the most modern and economically advantageous enzymatic technology, which does not pollute the environment and is justifiably called technology of the future. The catalysts (accelerators of biochemical processes) are enzymes produced by bacteria or, as they are also called, ferments, which are substances capable of purposeful action in minimal quantities.

The researchers' first achievement was to isolate from bacteria the enzyme, penicillinamidase, which is needed to produce 6-aminopenicillanic acid (6APK), which became the nucleus of future antibiotics.

Using the theoretical developments of genetics of microorganisms and, in particular, breeding, it was possible to enhance significantly the activity of enzymes they produce by means of selection. And the advances in engineering enzymology made it possible to develop a stable form of biocatalysts capable of participating 300-400 times in the process of 6APK production, thanks to which closed, virtually waste-free product cycles were developed.

The search for an optimum method of developing new antibiotics, from the idea and test tube to industrial production, involving the solution of complex basic and applied problems, took a total of about 5 years. In this period, labor input for production of new semisynthetic antibiotics was reduced, seven times more such products were produced in the same sized facilities, their cost and retail price decreased.

On the basis of the experience gained, a method was developed and introduced for recovery of another organic substance, 7ADTsK, the core for production of so-called beta-lactam antibiotics--cephalosporins, the biotechnological process of production of which has no equal abroad.

PHOTO CAPTION

Page 9 A computer controls the operation of enzyme reactors in a small fermentation room of the experimental plant of the Scientific Research Institute of Antibiotics. Photo by S. Gurariya.

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10,657
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BRIEF

SNAKE VENOM EXTRACTION--The Tashkent Snake Nursery of the Zoology and Parasitology Institute of the UzSSR Academy of Sciences is the only one in the country where scientific research is being done on the study of snakes and the properties of snake venom. The institute's serpentarium contains more than 200 snakes: cobras, vipers, efs, adders and a gyurza. A procedure has been developed here for keeping these reptiles in captivity and the snakes' life expectancy has been increased by systematically extracting venom from them. This venom is used for pharmaceutical and scientific purposes. The snake nursery produces 200 grams of dry snake venom in the course of a year. [Text] [Tashkent PRAVDA VOSTOKA in Russian 29 Feb 84 p 4] 12262

CSO: 1840/230

UDC 615.281.015.4:[579.861.2:579.23+615.919

ULTRASTRUCTURAL AND TOXICOGENIC EFFECTS OF BALIZ [SIC] ON STAPHYLOCOCCUS AUREUS

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGII I IMMUNOBIOLOGII in Russian No 12, Dec 84 (manuscript received 12 Dec 83) pp 20-24

KONSTANTINOVA, N. D., ZLISHCHEVA, L. I., RATGAUZ, G. L. and SHURYGIN, A. Ya., Scientific Research Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] In vitro studies were conducted on the effects of baliz [sic], an antibacterial preparation approved for clinical use in the USSR, on the ultrastructure and toxin production of Staphylococcus aureus 209p. Studies in distilled water and acetate-veronal buffer at pH range of 3.5 to 6.8 showed that baliz in a concentration of 0.01% resulted in 10% killing in 10 min, reaching a killing rate of 80% in 60 min. At a concentration of 0.8%, recommended for clinical use, the respective killing figures were 90% in 15 min and 99.99% in 60 min. Ultrastructural changes in the cells were noted within 10 min of incubation, showing a time-related deterioration of the cellular ultrastructure, reaching a maximum in 60 min. Early ultrastructural changes included essentially surface manifestations and, to some extent, the ribosomal-membrane complex. In addition, production of alpha-toxin in a highly toxigenic strain was reduced four-fold under the influence of baliz. Figures 2; references 12: 11 Russian, 1 Western.
[245-12172]

ANTIMETABOLIC 'VOODOO' TOXIN

Moscow SOVETSKAYA ROSSIYA in Russian 8 Feb 85 p 4

ZDOROVTSEVA, N. and NUVAKHOV, B.

[Abstract] The article reports briefly on findings of an American researcher who investigated the so-called 'zombie toxin' derived from a tropical fish and used in witchcraft in Haiti. It is explained that botanist Wade Davis of Harvard University became interested in the toxin after learning of a Haitian man who said he was poisoned with it and proclaimed dead and buried, after which his poisoners exhumed and revived him and forced him to work as a slave. Davis, whose findings are said to have been reported in a number of magazines, reportedly discovered the mechanism of the toxin's action, and found that a similar toxin exists in certain plants as well as other tropical fish, including one eaten as a delicacy in Japan.

The article goes on to record the following comments on this report by Candidate of Medical Sciences S. Kolayeva, senior science associate and head of a research group at the USSR Academy of Sciences' Institute of Biological Physics:

"The possibility of sustaining life for a long time in warm-blooded animals in conditions of minimal expediture of energy is one of the most interesting problems of contemporary biology. Its solution would open up extraordinary prospects for utilizing this state in biology and medicine: as a sparing method in the treatment of cardiac pathology, in stress situations, in oncology; it would facilitate life support for long space missions. However, even though this problem has received rather extensive elaboration, researchers are still a long way from introducing results into applied fields.

"In nature there exists the natural state of prolonged sustaining of life during hibernation--6-8 months with minimal consumption of energy in warm-blooded animals. During this period, their metabolism level is lowered by 100-150 times, but all of theiry systems function harmoniously...

"Clarification of the mechanisms of hibernation could become a strategy, suggested by nature, for modeling this process. At present, Soviet and American researchers are close to understanding the chemical nature of a substance that has been isolated from tissues of hibernating animals and which results in a sharp lowering of oxygen consumption when it is introduced. The effect lasts for several hours, and then animals return to the normal state on their own (without any inducement). These substances are called 'antimetabolic' and are found not only in tissues of warm-blooded hibernators, but also in a lungfish that lives in Africa, during estivation..."

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PHYSIOLOGY

UDC 611.428-616. 28

EFFECTS OF HYPOXIC HYPOXIA ON RAT LYMPH NODE ULTRASTRUCTURE

Tbilisi SOOBSHCHENIYA AKADEMII NAUK GRUZINSKOY SSR in Russian Vol 115, No 2, Aug 84 (manuscript received 10 Dec 83) pp 417-420

DURMISHIDZE, N. S., Institute of Experimental Morphology imeni A. N. Natishvili, Georgian SSR Academy of Sciences

[Abstract] In order to obtain a better appreciation of immune involvement in oxygen deficiency states, ultrastructural studies were conducted on mesenteric lymph nodes of Wistar rats subjected to hypoxic hypoxia by placement in a pressure chamber for 3 h/day for 1 to 45 days (307-310 mm Hg = 9000 m). The histologic and ultrastructural studies revealed exposure-related lymphocyte destruction and depletion and a decrease in the plasmocyte numbers. Concomitantly, within both the germinal follicles and the medulla, macrophage activation was evident. These morphological alterations indicate that in hypoxic hypoxia both the T and the B limbs of the immune system are affected, and that there is, as a consequence, a general immunosuppressed effect. Figures 1; references 3 (Russian).
[1736-12172]

PUBLIC HEALTH

NEED FOR DEDICATED MEDICAL PERSONNEL STRESSED

Moscow PRAVDA in Russian 4 Feb 85 p 7

[Article by L. Durnov, Professor, doctor of medical sciences]

> [Text] Notes of a Physician. At a scientific conference my colleague told me that he had attempted to study why persons chose medicine as a career. He explained, in particular, that about 20 percent of medical institute graduates "are not especially attracted to their future field of specialization or are not at all interested in medicine." And this includes only those who truthfully answered the questionnaire! Consequently, there are still people who go into medicine with only casual interest...

Every time we train physicians we encounter a certain contradiction: They are very much needed, and in large numbers, but where and how is so much talent to be recruited? That was not a slip of the tongue--a physician must have a physician's talent. It is not enough merely to be a good physician. It is necessary, in addition, to possess the talent of compassion and intellectual curiosity.

When I was taking notes from books on the qualities that physicians must have, I filled up two large notebooks. One of the works named 25 qualities without which a person cannot be a physician. Twenty five, and I still didn't see many others that should have been included. For example, courage. Yes, courage! It is easy to be compassionate from the outside, but it is difficult to be with a patient constantly, to live his pain and suffering and yet be always stronger and more courageous than the patient.

We had a pretty good fellow working in our clinic. His name was Volodya P. He was very attentive to children and obviously loved them and understood them. He worked in our collective for almost two years. We were very satisfied with him, but before two years were over, he submitted his resignation. I had a long discussion with him in trying to find the reason for his leaving. Perhaps you don't care for your comrades at work, maybe I am not making satisfactory arrangements for you, perhaps the scientific subject matter of your work doesn't suit you? "I like everything," he replied. "I

can't work in a clinic. I can't bear to see children who are ill, I can't bear to see the suffering of parents. I can't take it any more!" I tried to dissuade him: They say that the physician's life is not an easy one, and I repeated my favorite phrase "If not you, who then?"

But it was all in vain. Volodya came to our department unprepared for the daily struggle and the difficult ordeals that he would face, so did not survive.

Be courageous, doctor, but do not get accustomed to suffering! And until you have suffered with a patient and experienced his pain, you will not have become a physician. What is most terrible is to become accustomed to the pain of others and to stop sensing that pain.

I was lucky. I had occasion to meet many physicians whom I wanted to emulate.

I took the first steps of my career with the rural physician Aleksandr Ivanovich Makeyev. He was always composed and was able to calm others by his own tranquility in the most difficult situations. His hands were large, delicate, and warm. How he was trusted by patients! He seemed phlegmatic, but when necessary, he fully braced himself, his movements became quicker, and even his gait changed. And how he could talk to children! Without baby talk and without contrivance.

I remember the day he was awarded a medal at the military commissariat, many years after the war, when he said to me: "You know, this is a very precious medal. It is for my saving peoples' lives."

There is an outstanding group of old pediatric surgeons at the Morozov Hospital where I started to work after I left the countryside. There was no life outside the hospital walls for that group. No matter how early I used to come to work, one of them was always already on the job, and someone always stayed behind after I left work.

Unfortunately, one can sometimes hear an associate say that work time is over, that the person has "worked off" his time, as it is said. I must admit that it is offensive and painful to hear that said...

Any physician, and particularly a physician, knows how difficult it is sometimes to take upon oneself the heavy responsibility of a patient's fate.

Recently, I operated on Volodya. A five-month old boy, he already had a first and last name, but could not know it. Numerous up-to-date examination methods indicated that there was a tumor in the lower section of his stomach that was bound to major vessels which was hardly removable. Besides, the operation itself was a very hazardous one. But there were chances for success. Unfortunately, another treatment that could have obviated surgery did not prove to be effective. How difficult it is to make the final decision in such cases and to take upon oneself such responsibility! That responsibility is assumed every time a physician walks into an operating room or when he begins to treat a child. The operation was a success. Volodya will live, but it might not have succeeded...

Perhaps in no other profession does one have to learn so much constantly until the end of one's days. A physician who forgets that he is an eternal student ceases to be a physician. A pediatrician has one characteristic. He is forever a teacher. His personality exerts a strong educational influence on a child. It is not in vain that many children who have spent long periods in hospitals, brightened by the personality of pediatricians, dedicate themselves to medicine.

In going over what I have written, I understand that I have written about the ideal person. Still, I insist that a physician should be just that!

A collective is created by long and persistent labor. Several years ago Aleksey Arkhipovich Leonov presented me with a book on space psychology. It is a useful book. And not only for those who are working in the space field. For surely, a member of a collective at a clinic is also, to a certain degree, perhaps not in a completely closed, but at least "semiclosed" space. He works with a definitive group of people every day for no less than eight hours. And this work arrangement extends for several years, and sometimes, for the rest of his life. In this situation, he makes daily and hourly decisions about problems that are far from simple, oftentimes under very difficult, and even extreme circumstances. In contrast to cosmonauts and polar research workers who can not abandon their ship or deviate from their path, we, fortunately, do have that option. And once again, fortunately, we rarely use it.

Our collective is a collective of like-minded persons. We all came to this work in order to cure and save people. But we are all different. In the twenty-five years of our clinic's operation three persons left the "ship." They did not adopt the "unified character" that evolved among all of us. Yes, I am convinced that a unified character has beenddeveloped among the collective which, without eliminating the members' individuality, makes it possible to work alongside different people for many years.

We are all bound together by a love for children and our profession. At times I ask myself: what keeps us here, for surely there are professions that are easier than medicine and there are, after all, professions that pay more? But I know that none of us will change his chosen path.

Women in the pediatric department of the All-Union Oncological Scientific Center of the USSR Academy of Medical Sciences have a particularly difficult time. They are all mothers. We try not to hire persons who are not so that all the associates at the department have children. That way they will understand parents better. But the work is more difficult for them for the very reason that they are mothers. It is therefore so wonderful that there are so many women, so many caring mothers' hands among pediatricians! Nurses are no less valuable to me than are physicians. They have become dear to me through their selfless, and at times, heroic work.

My first teacher in the operating room was the nurse Tat'yana Kuz'minichna Gvozdeva. How well I remember my first operation after graduating from the institute. This was my first "appendicitis." My "baptism" took place in a rural hospital where an attendant stood behind me holding a kerosene lamp in

her hands (there was no electricity in the village). I became perplexed, everything seemed to be flashing in front of my eyes. My hands were not at all doing what they were supposed to be doing... I regained consciousness when the operation was completed. It turned out that I forgot everything I had learned at the institute and the entire course of the operation. This operation was done by the surgical nurse Tat'yana Kuz'minichna. And when she came out of the operating room she said: "What a fine surgeon has come to us!" One must live in the country in order to understand the meaning those words have for the reputation of a young physician.

We have good nurses. But still, the gap in the theoretical skills between a physician and nurse is too large. If I had my way, I would have students entering a medical school after graduating from the eight-year program and then have them study for five years at the school. And, of couse, I would pay them more. But instead, what do we have. Not long ago I was walking along the street and I saw an advertisement for a billboard poster with an offered salary that was one and half times more than the salary of a nurse. The posting of billboards does not require any education or any particular kind of responsibility--just don't glue the poster upside down!..

A lot depends on a nurse. After all, she shoulders the responsibility of patient care. Even the most intricate and brilliant work of a physician will not yield results if it is not followed up by the skilled and caring hands of a nurse.

We are losing nurses. Some of them, for a good reason (although not at all obligatory) are leaving in order to further their studies. Others are leaving for places where the work is easier: to the polyclinic, the sanatoria, and to the x-ray labs (the pay is more, retirement is earlier, and the workday is shorter), to the psychiatric and neurological departments (where the work is also difficult, but more profitable, i.e., longer vacations and better pay). But there are still others who are leaving the field of medicine altogether. I have met former nurses who were working as waitresses, sales clerks, and duty clerks at hotels.

There is much that needs to be done to make the work of nurses easier. For example, there are many functions that could be mechanized so that the nurses can give their time to patients.

The collective at the clinic is a unified collective. There are no second-class jobs in the collective. Much depends on each member of the collective, and the word of a hospital attendant can be no less important to parents than the word of a professor.

During the first postwar years the morbidity and fatality rates were either completely eliminated or sharply reduced for a number of children's infectious diseases such as poliomyelitis, diphtheria, tuberculosis, meningitis, and many others. The fatality rate for other diseases took over first place. There were not more cases of those illnesses--they rarely became more noticeable.

And now that it has been less than thirty years since scientists have been earnestly engaged in recognizing and treating tumors in children, we see that a previously dismal picture is changing. The prominent scientist in the field of pediatric oncology D. Angio writes: "Thirty years ago the future of children with cancer was depressing...the little boy or little girl with a tumor who survived was the exception to the rule...But now the picture has changed. We can now say that more than one half of the children with malignant tumors will survive."

Now that we have obtained effective means of controlling cancer, we are particularly upset that the treatment of children is often begun when the child is in a very grave condition, in very late stages. We are deciding what to do with Volodya D., a seven-year old boy. His illness was allowed to develop unchecked. It will be difficult for us to help him. Unfortunately, although not too often, some of our patients fall into the hands of quacks and charlatans. Why is this so? The primary reason probably is that, inasmuch as we must be honest with the patient and his parents in particular, in many cases we cannot guarantee successful treatment. On the other hand, quack doctors and charlatans are ready to promise anything. And parents go to them. There is another reason that is no less important: The banner of mystery waves over quackery. The quacks have an advertisement. Yes, the advertisement of imaginary success...

Unfortunately, for many parents and relatives the news that their child has cancer is like a death sentence. Medical personnel are to blame for this themselves. Because of the almost complete lack of medical educational work in the field of pediatric oncology, many people do not know about the possible successful treatment of malignant tumors.

On the eve of holidays many congratulatory cards are sent to our department from patients whom we have treated.

And sometimes we are visited by quite grown-up persons whom we find are difficult to recognize as our former little boy and little girl patients. Some of them have become physicians. I believe they will make splendid specialists.

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HYGIENIC ASPECTS OF LABOR ACTIVITY IN ELECTRONIC INDUSTRY WORKERS AND WAYS TO INCREASE IT

Kiev VRACHEBNOYE DELO in Russian No 12, Dec 84 pp 91-94

[Article by I. I. Datsenko, G. S. Semenova and O. P. Novak, "Hygienic Aspects of Working Activity in Workers of the Electronic Industry and Ways to Increase it", from the Department of General Hygiene (director--Prof. I. I. Datsenko) and the Department of Optical Diseases (director--Prof. G. S. Semenova) of the L'vov Medical Institute]

[Text] Advances in the scientific-technical progress of production have led to the wide usage of electronics and radio electronics in various fields of the national economy. Because of a rise in production, the introduction of new industrial complexes and the singularity of the technological process of electronic instrument building, it has become necessary to study physiological aspects linked to optimizing conditions for labor and rest for workers in these leading sectors of industry. A characteristic aspect of work carried out in these types of enterprises is the lack of strenuous physical effort, a strictly defined work place and position, great stress on the sight organ and nervous and emotional stress.

The most widely represented occupation in electronic industry is that of testers of components and instruments of electronic equipment (CIEE). Workers' labor capacity first of all depends upon conditions, work schedule and rest for CIEE testers, and how factors characteristic of this industry affect them.

One of the basic tasks of work hygiene when resolving problems of its scientific organization is to reveal and eliminate factors which negatively affect work efficiency, and to find ways to increase it and maintain it on a high level (S. A. Kosilov et al. 1974; Y. I. Kundiyev, 1980; Y. V. Lyadova, 1981; A. O. Navakatikyan, 1981; V. V. Kustov et al., 1982; N. I. Machyulite et al., 1982).

In spite of achievements in the field of health care for workers, work hygiene in the electronic industry has not been studied enough (L. S. Dubeykovskaya et al., 1977; B. A. Shafranov, 1981) and therefore, the development of measures which will increase work activity and their

introduction in production is a very urgent scientific-practical task.

We employed the simplest and briefest methods of physiological testing, using modern measuring devices, in order to study work capacity of workers in production conditions. For characteristics of work capacity, we determined the latent period (time of response reaction) and duration of the response reaction (mechanical component) to simple and complex audio and light stimuli, which we registered with instrument IPR-01 (measurer of successive reactions). We also studied the latent period and duration of the response reaction according to data of an associative experiment with the use of test blanks, suggested by A. I. Vaysman and K. D. Dyatlova (1980), frequency of cardiac contractions, arterial pressure, duration of one production operation and work productivity. Microclimatic conditions (temperature, rate of air movement and relative humidity) was determined by standard methods (A. A. Minkh, 1973), and the amount of oxide and nitric oxide, carbon monoxide and ozone was determined with methods described in a book by Y. A. Peregud and Y. V. Gernet (1973). Tension of the electromagnetic field was measured with the IEMP-1 device and mild X-rays were measured with the MRM-2 device. The noise level was determined with a Sh-3M noise gage, and illumination--with a Y-16 luxmeter. Received numerical data were processed with the variational statistics method. Reliability of differences between average indicators in compared groups (P) was established by using the Student criteria.

Studies were conducted in several stages at one of the largest electronic industrial enterprises. In the first stage, we studied conditions, schedule of work and rest for the workers, factors of the production environment and work capacity of CIEE testers in the process of the work day, week and work shift. The second stage involved developing measures for optimizing schedule and conditions of work and rest for industrial aesthetics and their assimilation into production. The third stage dealt with studying the effectiveness of sanitary-hygienic measures developed and incorporated into production.

We studied 156 workers, 108 of whom were CIEE testers and 48 of whom were fitters, who served as the control group.

The studies showed that the latent period and duration of response reaction to simple and complex audio and light stimuli, which are indirect indications of the condition of work efficiency, were gradually reduced toward the middle of the work day for fitters and CIEE testers, reaching the lowest values in the 3rd hour of work. However, the dynamics of changes in these indicators, expressed in percentages, are varied for CIEE testers and fitters. After the first 2 hours of work, indicators of the latent period and duration of response reaction to simple and complex audio and light stimuli decreased 4-9.6% in fitters and CIEE testers. This decrease is not reliable ($P>0.05$).

Toward the middle of the work day (after the 3rd hour of work), the latent period and duration of response reaction to simple and complex audio and light irritants decreases more in fitters--from 19.4 to 26.0% ($P<0.05$), than in CIEE testers--9.2-11.6% ($P>0.05$). Later (after the 4th hour of work), these indicators for all types of irritants in the fitters remained lower than

initial data, on an average up to 16.8% ($P>0.05$), whereas for CIEE testers they were 7.6-9.8% ($P>0.05$) higher than indicators before work.

At the end of a work day (after the 7th hour of work), the latent period and duration of response reaction to simple and complex audio and light stimuli in CIEE testers was from 8.5 to 10.0% ($P>0.05$) higher than initial data. In fitters they were still, on an average, 4.7% ($P>0.05$) lower than these data and 1.1% ($P>0.05$) higher than data before the beginning of work only in response to the complex audio stimulus. After the last, the 8th, hour of work, these indicators for all types of irritants in fitters are slightly higher than initial data--6.8-8.5% ($P>0.05$)--and for CIEE testers this increase is more significant and statistically reliable--from 27.4 to 34.5% ($P<0.05$).

This rule in the dynamics of change of the latent period and duration of response reaction was derived from data of an associative experiment with the use of test blanks, proposed by A. I. Vaysman and K. D. Dyatlova (1980). Here, the less expressed reduction of the latent period and duration of response reaction to all forms of irritants in CIEE testers in the middle of the work day and the significant, statistically more reliable, increase of them at the end of the work shift in comparison to data received from fitters, are proof of the deterioration of work efficiency already at the end of the 1st and especially at the end of the last hour of work at the testing stand. This indicates a retardation in the speed of information processing.

The degree to which work efficiency of CIEE testers depends upon the duration of work at the testing stand can be judged from the time spent on a unit of productive operation. Thus, whereas in the 1st hour of work, a worker at the testing stand spent 3.15 ± 0.10 minutes testing one kinescope, in the 2nd hour this time increased to 3.63 ± 0.12 minutes. After the 3rd hour of work, it amounted to 3.68 ± 0.12 minutes, and in the 4th hour--4.51 ± 0.13 minutes ($P<0.05$). Consequently, when the duration of work at the testing stand is increased, work productivity of CIEE testers gradually decreases.

A determination of the latent period and duration of response reaction to all forms of irritants throughout the work week showed that toward the middle and end of the week these indicators increase slightly during the work day for fitters and CIEE testers. However, the tendency for the latent period and duration of response reaction to increase is insignificant and statistically unreliable.

A study of the dynamics of change in the latent period and duration of response reaction in fitters and CIEE testers of the first and second shifts helped determine that absolute values of these indicators for simple and complex audio and light stimuli in workers of the second shift throughout the study are higher than in these same workers in the first shift. At the same time, while this increase is insignificant in fitters, it is more expressed in CIEE testers.

A study of the condition of the cardiovascular system in CIEE testers showed that in the middle, and especially at the end of the work day, the maximum

and minimum arterial pressure and frequency of cardiac contractions increase.

Whereas, at the beginning of a work day, arterial pressure in CIEE testers, according to absolute indicators, hardly differs from data received before work, then in the middle of the day, toward the end of the 3rd and 4th hours of work, maximum arterial pressure increases 4.2 and 9.1% ($P>0.05$), while the minimum increases 3.7 and 10.3% ($P>0.05$), respectively. At the end of the work day, maximum arterial pressure rises 13.3 and 22.1% ($P<0.05$), and the minimum rises 14.9 ($P<0.05$) and 26.4% ($P<0.05$), respectively. For fitters, maximum and minimum arterial pressure hardly differs from initial data throughout the entire study.

A similar rule is also observed in the dynamics of change in the rate of cardiac contractions. After the 1st hour of work, the rate of cardiac contractions in CIEE testers rises 1.5% ($P>0.05$) and in fitters, 2.2% ($P>0.05$). Later, the difference in the elevation of the rate of cardiac contractions in CIEE testers and fitters is more significant. At the end of the 3rd, 4th, 7th and 8th hours of work, the rate of cardiac contractions in CIEE testers rises 6.2, 11.5 ($P>0.05$), 14.2 and 25.6% ($P<0.05$), compared to 3.5, 2.3, 2.9 and 5.6% ($P>0.05$) in fitters.

Sanitary-hygiene studies have shown that CIEE testers are subjected to the influence of a complex of unfavorable factors which are specific for this production (mild X-rays, electromagnetic field, nitric oxides, carbon monoxide and ozone) and those which are unspecific. Absolute indicators of the factors listed above in the production environment were basically within the limits of allowable levels, but as a complex they exert an unfavorable influence.

Thus, conditions existing in the enterprise, the work and rest schedule, marked physical and nervous and emotional stress on CIEE testers and the influence of the complex of production factors on them leads to a worsening of indicators of work efficiency, activity of the cardiovascular system and a decrease in the productivity of their work.

Later, based on received data of the work and rest schedule, we developed a complex of sanitary-hygienic measures, which were later approved by the medical unit and adopted for use by engineering-technical workers of the production association.

A month after the recommended measures were introduced, all of the indicators studied previously were tested again. Improvement of sanitary conditions of work and rest, which consisted of improving the work schedule and lighting, forming shops in the latest industrial aesthetics, introducing exercises into the general complex of production gymnastics for working unused muscles, including eye muscles, and giving CIEE testers [eleuterokokka] and vitamins A, C and B groups, increased the work capacity of these workers significantly. Thus, at the end of the 1st hour of work at the testing stand, the latent period and duration of response reaction to all forms of irritants decreased from 4.0 ($P>0.05$) to 23.7% ($P<0.05$). At the end of the 2nd hour of work, this

difference was even more expressed, and decreased from 10.9 ($P>0.05$) to 41.0% ($P<0.05$), at the end of the 3rd hour, 2.6-21.0% ($P>0.05$) and at the end of the 4th hour, 8.3 ($P>0.05$)-32.1% ($P<0.05$), respectively.

Moreover, workers now complain much less about not feeling well, which has been characteristic for this production.

After implementing the sanitary-hygienic measures, 1.6% ($P>0.05$) less time is spent on one production operation in the 1st hour of work at the testing stand. In the 2nd hour of work at the testing stand, an even more marked, statistically reliable, reduction of time spent testing one kinescope was observed, an 11.6% ($P<0.05$) reduction, in the 3rd hour, a 4.3% reduction ($P>0.05$) and in the 4th hour, 10.6% ($P<0.05$).

Thus, the studies conducted on work conditions and its schedule, along with rest, the study of work efficiency and work productivity and the condition of the environment and production factors in work places of CIEE testers confirmed the necessity of improving the sanitary conditions of the latter. Therefore, it is important to introduce scientifically founded sanitary-hygienic measures, in particular the increase of frequency of breaks, introduction of production gymnastics, improvement of lighting work places and developing measures of industrial aesthetics.

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METHODS FOR IMPROVING VACCINE PROPHYLAXIS OF INFECTIONS

Kiev VRACHEBNOYE DELO in Russian No 12, Dec 84 pp 96-101

[Article by K. M. Sinyak and O. M. Verner, "Methods for Improving Vaccine Prophylaxis of Infections", from the Department of Epidemiology (director--Prof. K. M. Sinyak) of the Kiev Institute for the Advanced Training of Physicians]

[Text] Resolutions of the 26th CPSU Congress and decrees of the CPSU Central Committee and USSR Council of Ministers, "Measures to Further Improve Public Health Care" (1977) and "Supplemental Measures for Improving Public Health Care" (1984), include a grand program for further improvement of health care as a sector of the national economy. Resolutions of the Communist Party and Soviet government have indicated that the material-technical base of health care will be strengthened, highly qualified personnel will be provided and modern diagnostic and medical equipment will be supplied. A significant rise in the quality of therapeutic-prophylactic and sanitary-epidemiological service will result in populations achieving great progress in controlling infectious diseases. However, even now, the task of broadening and improving organizational and specific measures for preventing infectious diseases has not lost its urgency.

The epidemic process and aspects of its manifestation are specific for each infectious disease. Academician D. K. Zabolotnyy and his student, L. V. Gromashevskiy, Academician of the USSR Academy of Medical Sciences and Hero of Socialist Labor, who are founders of epidemiological science, have proven that the manifestation, development and elimination of this process depend upon general principles, the interactions of its driving forces. Therefore, the scientifically-founded principle of combating infectious diseases is disruption of this process. This is achieved by neutralizing the source, by interrupting the mechanism of transmittal or creating a taut collective immunity in the population. This last problem can be solved by the wide usage of vaccines. Actually, many years of work conducting planned measures for initial active immunization and revaccination have helped to form a taut collective immunity, on top of which real conditions have been created for reliable protection of our nation's population from many infectious diseases. Our generation does not remember those dreadful

epidemics of smallpox, diphtheria, whooping cough, measles, poliomyelitis, tuberculosis, tularemia and other infections with hundreds of thousands of illnesses and tens of thousands of fatal outcomes. The beneficial effect of active immunization for the epidemic process in many infections causes a continual increase in the quantity of inoculations given to the population. This has given a number of specialists the grounds to speak of expanding vaccinations in human society. The experience of massive use of vaccines indicates that active immunization is, although not unique, an extremely important measure in the near future for preventing illnesses caused by many infections. According to P. N. Burgasov's conclusion (1974), vaccine prophylaxis is viewed at the present not only as a means for developing epidemic security in a territory, but also as an important link in the prophylactic trend of Soviet public health.

The basis for vaccine prophylaxis is the known regularity manifested in the specific response of the body to an injected antigen. The development of a first-class protective reaction in the body depends upon many principles: the vaccine dose and intervals between inoculations, the antigen load, the body's physiological condition as a whole and the immune-competent system, the nature of the vaccine in particular. Resistance will form differently, depending upon whether the vaccine agent consists of a dead or living antigen. For example, the diphtheria anatoxin evokes an intense humoral antitoxic immunity in the vaccinated body. However, the anatoxin does not cause cellular resistance of tissues. Therefore, even in children, who are inoculated qualitatively, the pathogen entering into the upper respiratory tract will multiply there. This explains why there are "healthy" carriers of corna bacteria during massive planned diphtheria inoculations (K. D. Pyatkin, 1984). Humoral immunity of the same nature develops in people inoculated with dead vaccines against tetanus, encephalitis, poliomyelitis and several other infections.

When immunized with a living vaccine, for poliomyelitis for example, the body develops cellular resistance along with humoral shifts. As a result of massive inoculations with living poliomyelitis vaccine, intense humoral immunity forms, which is an insurmountable obstacle in the path through which the virus travels from where it was injected into the body to the central nervous system, where it activates its disease-producing effect. The simultaneously-developing cellular resistance of the tissue of upper respiratory tracts and the digestive tract creates conditions in which the virus may become adapted, which causes the pathogen's circulation in the territory to be repressed.

The health care service has a large amount of inactivated and living vaccines at its disposal, which differ in preparation methods and mechanisms of immunological reactions in the vaccinated body, but, on the whole, they are agents which influence the epidemic process very effectively. However, some of them, especially the inactivated ones, contain ballast substances along with the specific antigen, which can evoke allergic and feverish reactions and other complications, especially in people who are subject to allergic reactions (V. D. Belyakov, 1975). Considering that the basic goal

of vaccine prophylaxis is to ensure that healthy bodies are not susceptible to infection pathogens, the secondary reactions we mentioned, although rare, are undesirable.

Many researchers believe post-vaccine complications will be sharply reduced by obtaining chemical vaccines, or molecular vaccines, as they are also called (A. A. Vorob'yev, 1980). They can be produced with both biological and, apparently, chemical synthesis. However, no matter how they are obtained, chemical vaccines will differ from today's counterparts by a higher concentration of the antigen and a low content of ballast substances, owing to which they will be more immunogenic and safer for people being vaccinated. Another advantage of chemical vaccines is the fact that they will be polytypic, that is, they will contain antigens of several infection pathogens.

This achievement of constructing dead vaccines is the development of technology for preparing subvirion glycoproteid vaccines which consist only of the protective antigen and are almost completely rid of ballast substances. This makes it possible to substantially increase the antigen load. The anti-influenza vaccine, prepared by M. P. Chumakov (1980), contains antigens to the influenze B virus and several varieties of the influenza A virus. The vaccine, injected into the body, evokes high immunological shifts without any essential secondary symptoms. Therefore, M. P. Chumakov (1980) believes that the prophylactic agent he prepared should be used for active immunization of children and adults, for whom inoculation with living influenza vaccine, inactivated whole virion vaccine, and split virions is contraindicated.

The development of technology for preparing ribosome vaccines is also considered to be a very promising direction in creating a new type of protective agent. According to V. I. Levinson's data (1979), ribosomes, obtained from a microbe cell, along with type-specific immunological shifts, can evoke a protective reaction in the body against several pathogens, especially against serologic variations of the same pathogen. The high purity of ribosome vaccines and their antigen polytypic behavior make it possible to develop areactogenic multi-component agents for a number of pathogens of infections.

In this case, the principal innovation is not only the development of synthetic micromolecules which possess antigen properties. In the future, the phenotypic correction of gene control of immunogenesis will be resolved. Encouraging, in this plan, is the stimulating system wherein the carrier can be polyacrylic acid or poly-4-vinylpyridine. When resolving such a problem, it will be possible to successfully inoculate children who have resistance to a certain antigen (R. M. Khaitov, 1982).

A complete study of vaccines will reveal the possibility of essentially expanding the range of their possible use for protecting people from disease-producing pathogens. At the present, researchers are attempting to develop vaccines which prevent the harmful effect of pathogenic stimulants on a developing embryo. A living vaccine for controlling German measles has already been created and is used in many countries. Inoculating the mother will prevent the German measles virus from exerting a teratogenic effect on the developing fetus.

Many vaccines are employed widely in veterinary practice for immunizing animals and preventing their illness, thereby stopping circulation of the pathogen among animals and its possible contamination of human beings. However, until now, mainly domestic pets and agricultural animals have been inoculated. The development of a living anti-rabies vaccine makes it possible for the first time to suppress epizootic rabies by using peroral immunization of wild animals. This development is very significant in the attempt to protect animals from contracting this most serious illness--rabies--and transmitting the pathogen to human beings. This also removes the necessity of shooting wild animals to prevent epizootic rabies. This is the new role for vaccines--careful preservation of the wild animal in nature.

In addition to improving the quality of vaccine agents, it is also necessary to improve immunization methods for large and small contingents of the population. At the present, there are two approaches for conducting massive inoculations. At the present, there are two approaches for conducting massive inoculations. The first and most frequently encountered approach is that of creating inoculation offices and inoculation brigades, which conduct planned inoculations and increase the number of vaccinated people daily. However, in such a set-up for vaccinating, substantial contingents of the population do not receive vaccines, and the pathogen may continue to be circulated among them. This shortcoming could be eliminated if there were massive momentary vaccinations in a certain territory for a short period of time. This way, the population can usually be immunized during a particular epidemic situation, which has become serious in that territory. Massive momentary vaccinations were conducted in the initial years of the onset of poliomyelitis (K. M. Sinyak, 1968), and later, of measles (O. E. Shul'ga, K. M. Sinyak, 1979). Today, which decreases the number of susceptible people among whom stable circulation of the pathogen is possible.

Results of many authors' observations have shown that when inoculations are given to 90-95% of the susceptible people, the pathogen ceases to circulate. Consequently, momentary massive inoculations play a decisive role in displacing and stopping the pathogen's circulation among the population. Although people have become accustomed to parenteral vaccine injections, using an ordinary syringe, we should acknowledge the fact that secondary reactions are often linked to the use of a needle syringe. Therefore, another important condition of progress is to discontinue its usage. Instead of the needle, the injection method of introducing the vaccine parenterally is used more and more often; there are vaccines which can be injected per os, and the possibility of immunization through the upper respiratory tract is being studied (A. A. Vorob'yev, V. A. Lebedinskiy, 1975).

However, in spite of the fact that vaccines and the vaccination process itself are being improved, the problem of inoculating contingents subject to active immunization remains an urgent one.

On one hand, the insufficient amount of people inoculated is linked, to a significant degree, with objections to inoculations because of temporary oppositions. It is commonly known that inoculating a child during convalescence after an illness or one with allergic reactions may cause post-vaccination reactions to develop. Consulting offices would help overcome

the problems greatly, by finding such children and preparing the child, with sanitation measures, for the planned inoculation.

On the other hand, epidemic security is improving, according to the increase in sanitary-epidemiological service to the population and broad prophylactic measures, and this creates the new problem of the completeness of the inoculations' scope. Usually, when there is danger of some infection spreading, the population will voluntarily agree to anti-epidemic measures, including prophylactic inoculations. While the degree to which danger of illness is reduced, the number of refusals to be vaccinated increases. Nor do possible reactions after immunization of children evoke positive emotions in parents. For this reason, even families with a high cultural level voluntarily, frequently and actively, discuss the problem of the necessity of inoculating their children. The population becomes cautious when hearing medical workers speak out (often not until it has been thought out) about the effectiveness of vaccine-prophylaxis. For example, planned immunization of children with DPT-vaccine helped prevent hundreds of thousands of illnesses caused by diphtheria, whooping cough and tetanus. However, while these infections contribute to a low illness rate, pediatricians note allergic and feverish reactions in some children after inoculations (V. D. Belyakov, 1975), and convey their observations to the public. If post-vaccine complications even occur in children whose reactions are changed by allergy, such children should be exposed and taken into account. Then the problem of how to conduct immune-vaccination for them should be resolved in consulting offices or in specially organized visits. Their basic function is to devise individual schemes and regimens for immunization and to determine a plan for desensitizing treatment of children with allergic illnesses under the control of laboratory tests.

Active immunization for measles could serve as another example. A single inoculation of children exerted a powerful effect on the epidemic process. As a result, every year 300,000-300,000 cases of measles infection, which is the most dangerous for children, are prevented in the Ukrainian SSR alone.

With a single inoculation we do not observe severe complications with fatal outcomes developing after measles, which, in the years before vaccines, were prevented by injecting anti-measles serum, gamma globulin, which cost a large amount of money and which diverted a great number of medical workers for yearly injection of millions of doses.

Consequently, the effectiveness of massive active immunization for measles is obvious. However, based on the fact that a portion of the children contract measles several years after inoculation, some medical workers have formed an illusory opinion concerning the insufficient prophylactic value of living measles vaccine inoculations. Thus, the conveyance of insufficiently conclusive information to parents leads, in many cases, to refusal of inoculations.

There is no doubt that post-vaccine complications, and, moreover, the effectiveness of active immunization, must be constantly under the scrutiny of medical society. All gathered data must be thoroughly and completely analyzed and discussed and we must strive to improve vaccines and vaccine-prophylaxis.

International experience indicates that it is not enough to simply proclaim government decrees on compulsory immunization of the population. Active and literate sanitary-instructive work among the population is also very important. The broad program now existing of vaccine prophylaxis for infections is conducted free in our nation by government therapeutic-prophylactic institutions, with the public's participation. It will be more effective if it becomes a public program with therapeutic-prophylactic institutions participating in it. It is entirely possible to achieve this, if medical workers can correctly comprehend the meansing of active immunization in the overall arsenal of means to combat infections.

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WATCH OVER HEALTH OF SOVIET PEOPLE

Moscow ZDOROV'YE in Russian No 2, Feb 85 pp 2-4

[Article by TASS]

[Text] On 14 December 1984, a solemn meeting convened in the Hall of Columns of the House of Unions, dedicated to the bestowal of the Order of Lenin to the USSR Acadmey of Medical Sciences. This high award was bestowed upon it for major achievements in development of medical science and national health care.

The presidium consists of G. A. Aliyev, member of the Politburo of the CPSU Central Committee and first deputy chairman of the USSR Council of Ministers, V. A. Medvedev, CPSU Central Committee department chief, executives of the CPSU Central Committee, administrators of a number of ministries and agencies, prominent medical scientists and representatives of public organizations.

An honorary presidium was elected with inspiration as part of the Politburo of the CPSU Central Committee headed by Comrade K. U. Chernenko.

A speech was delivered at the meeting by G. A. ALIYEV, who was warmly greeted by the audience. On behalf of the CPSU Central Committee, Presidium of the USSR Supreme Soviet and USSR Council of Ministers, he cordially congratulated the staff of the Academy of Medical Sciences, all those who stand watch over the health of the Soviet people, on receiving the highest award of the homeland.

The speaker stated that "It is with special satisfaction that I transmit to you and in your person the over 6 million strong detachment of workers in Soviet medicine and public health warm congratulations, wishes for new scientific achievements, new success in safeguarding and strengthening the health of our people, on behalf of K. U. Chernenko, general secretary of the CPSU Central Committee and chairman of the Presidium of the USSR Supreme Soviet. You are well aware of the enormous attention that Konstantin Ustinovich devotes to development of public health, improvement of material and spiritual life of Soviet people. At his initiative, a number of important documents were approved, which pertain to further improvement of all endeavors in the national economy, which strengthen even more the social orientation of our plans. This is convincing proof of the fact that concern about human labor was and still is the first and foremost concern of Lenin's party."

G. A. Aliyev continued, indicating that the USSR Academy of Medical Sciences, which was founded in 1944, when the salvos of the Great Patriotic War were still roaring, has traveled a long and noble route in a historically short time, having become one of the largest centers of medical thought in the world. And the award of the Order of Lenin to the academy constitutes national recognition of its merits and its supreme scientific authority. It is also a confirmation of the achievements of a socialist society in the exceptionally difficult and important matter of safeguarding the health of all the people in the country.

From the earliest days of victory of the revolution, Soviet science and the formed Soviet health care system became effective factors in consolidating the conquests of the revolution, raising physically and morally healthy generations of builders of a new world. Foundation of the academy was the logical result of development of Soviet public health in both the theoretical and practical aspects. It became the worthy heir of progressive traditions of Russian medicine.

The search for new methods of disease prevention and treatment on the broad foundation of synthesis of natural, engineering, social sciences and the art of healing constitutes an approach that is based on the Marxist-Leninist dialectical method, which served as the basis for all of the academy's endeavors. It changed into the headquarters of scientific thought, which accumulates and summarizes the results of work in all areas of medicine.

The academy has made a significant contribution, not only to development of Soviet medical thought, but to formation of the Soviet type of medical scientist, physician, representative of a genuinely national intelligentsia. Loyalty to the cause of the October Revolution, Marxist-Leninist world views and a high degree of professionalism are blended in him with fervent patriotism and internationalism, selfless love for the people expressed by persistent, often heroic and, in the terrible war years, life-threatening labor for several generations now of Soviet physicians.

At all stages of development of Soviet society, medical scientists kept in step with the times. Pursuing timely basic research and actively responding to the needs of health care practice, they enriched and glorified Soviet science with new discoveries. There was also birth of an utterly new branch of science, space medicine.

Without the active participation of medical science, the significant social achievements, in which there was profound disclosure of the humanistic substance of our regime, would have been impossible: striking improvement of the health status of Soviet people representing all nations and nationalities, all groups of USSR population, and general increase in life expectancy of Soviet people.

Dwelling on the distinctions of the present stage of development of medical science, the speaker made special mention of the significance of a basically new form of medical care, the specialized medical services, and he emphasized the large scale of activities of the academy, which involved the entire nation. In particular, problems of major social relevance are being solved by

scientists in the Siberian Department of the USSR Academy of Medical Sciences. Together with medical scientists in other regions, they are working out the scientific bases for medical and hygienic support of regions in Siberia, the Far East and Extreme North, which have already proven their efficacy in the area of construction of BAM [Baykal-Amur Railroad].

Strengthening of ties between scientists and worker groups is very important. Implementation at enterprises of programs that contribute actively to protection of health, improvement of working conditions demonstrates once more that man, the worker, is not only the main productive force, but the main asset for a socialist society.

Our society is proud of the fact that Soviet medical scientists are making a large contribution to the development of worldwide science, they are at the frontiers of disease control. Our medical science, the USSR Academy of Medical Sciences are engaged in particularly close and diversified collaboration with scientists of socialist countries. The broadest horizons are being opened up in this direction by implementation of agreements of the Economic Conference of CEMA-Member Nations on the highest level.

Having discussed the tasks facing medical science and Soviet public health as a whole, the speaker declared that they are inseparable from the concerns and plans with which the communist party and the entire Soviet people live. The entire life of our society is presently proceeding under the mobilizing influence of the decisions of the February, April and October (1984) plenums of the CPSU Central Committee and speeches of Comrade K. U. Chernenko. The new wave of creative energy of the masses, which is aimed at successful fulfillment of outlined plans and providing a good start for the future, was inspired by the keynote speech of Konstantin Ustinovich at a meeting of the Politburo of the CPSU Central Committee.

The fact that our country has entered into a period of active preparations for the 27th CPSU Congress, at a discussion of which a document will be submitted of enormous theoretical and political importance--new edition of the Party Program--lends special political meaning to our multilevel and multifaceted work, emphasized G. A. Aliyev. Today there are every grounds to state that the tasks put by the 26th Party Congress in the area of safeguarding the health of the Soviet people, are being performed on the whole. In this respect, the decisions of the June (1983) Plenum of the CPSU Central Committee played a basic role; they defined the specific directions of comprehensive improvement of Soviet health care. Full provision of the right guaranteed by the Constitution for health care, all-encompassing satisfaction of the needs of Soviet people in all types of medical care and preventive services, extension of their active longevity--such is the present main social order made by society to medical scientists and the entire system of Soviet health care.

At the same time, the speaker observed that the level of medical care does not yet always meet the growing demands of Soviet people. In particular, there is a need for considerable improvement of operation of medical institutions, the important task for which is still to lower morbidity involving temporary disability. Problems of further extension of life expectancy, reduction of cardiovascular diseases, strengthening the health of children, introduction of

more refined methods of early detection and treatment of diseases require the joint efforts of medical science, public health agencies and other social institutions. Development of basic questions of theory, methodology and sociology must be raised to a significantly higher level.

The major route for solving these problems is to intensify scientific research, work of the entire health care system, to improve its quality, to assimilate faster the advances of science and technology and, first of all, to make wise use of what we already have. Each ruble, each national kopek put into a sphere of vital importance, national health care, must be used more efficiently.

The founding principle of health care in a socialist society is prevention. The task advanced by the party, of gradual coverage of the entire population by annual dispensary observation must effectively serve to this end. Purposeful developments and recommendations of scientists must become the basis, the foundation for implementation of this exceptionally serious social and political measure.

In addition to an individual's general cultural level, the concept of socialist civilization implies a high degree of physical, as well as sanitary and hygienic culture. This also includes wise organization of leisure time, scientifically validated diet, formation of wise requirements, the habit to view health as "government property" in the apt expression of Lenin, i.e., as a particularly valuable social asset. It is also necessary to think about serious improvement of dissemination of medical information.

The speaker continued, indicating that acceleration of scientific and technological progress, which is one of the most important present tasks, is a complex problem that requires efforts on the part of all basic and applied sciences. The joint research by scientists of the most varied specialties is particularly important to progress in medicine. For the knowledge that medical specialists have, everything that is contributed to the treasury of the science dealing with life by biologists, physiologists, chemists, cyberneticists and philosophers is ultimately intended for man, to safeguard and improve his health and consolidate his wellbeing. In this regard, interaction of the two academies, USSR Academy of Sciences and Academy of Medical Sciences, which is aimed at development of new products and technologies, future use of advances in the basic sciences in medical practice, is acquiring increasing significance and merits every support.

Whatever the specialty of a physician, he always has to deal not only with disease, but primarily with a person. Against the background of the selflessness and dedication of hundreds of thousands of our physicians, we still encounter the particularly unpleasant instances of failure to perform their professional duty by medical workers and other negative phenomena. In this regard, G. A. Aliyev stressed the great importance of a personal example, the ethical image of the preceptor--scientist, pedagogue, administrator of a hospital or polyclinic--to the training of public health personnel and education of future physicians.

It is the first and foremost professional and civic duty of all public health workers to value highly the respect of the people, honor of a medical worker and multiply the merits of medicine in the eyes of the public.

Turning then to analysis of the current international situation, which has grown dangerously acute through the fault of imperialistic circles in the United States, the speaker characterized the active, aggressive, peace-loving foreign policy of the Communist Party and Soviet government; he stressed the major significance of new constructive Soviet initiatives aimed at not only stopping, but turning around the arms race, to provide people of all nations with the opportunity to live and work with an easy mind.

That situation that has developed in the modern world urgently demands the active contribution of all progressive, democratic and peace-loving forces to the cause of preventing the threat of war, defending peace and safety of nations. Progressive medical figures, participants of the international "Physicians of the world for the prevention of nuclear war" movement are in the front lines of the antiwar statements of the public. Its humanistic endeavors have been highly praised in a recent response by Comrade K. U. Chernenko to an appeal by the 4th congress of this movement. Representatives of Soviet medical science and all of our health care workers play a large part in it.

Nowadays, the ancient Hippocratic oath is acquiring a new dimension, it is supplemented with the obligation to apply every effort to counteract the nuclear menace. The Soviet Union is the first country where such an addition has been made to the physician's oath. More than a million Soviet physicians have endorsed the appeal to stop the nuclear arms race. There is no doubt that the voice of Soviet scientists and physicians, the voice of the USSR Academy of Medical Sciences will continue to echo loudly in the strong protest of all of the world's honest people against build-up of international tension by the imperalist forces, against the threat of war.

G. A. Aliyev read the ukase of the Presidium of the USSR Supreme Soviet and pinned the Order of Lenin to the academy's banner to the strong applause of those present.

On behalf ot medical scientists. N. N. BLOKHIN, president of the USSR Academy of Medical Sciences, expressed profound gratitude to the CPSU Central Committee, Presidium of the USSR Supreme Soviet, the Soviet government and Comrade K. U. Chernenko for this high award.

S. P. BURENKOV, USSR minister of health, YU. A. OVCHINNIKOV, vice-president of the USSR Academy of Sciences, N. Z. MILASHCHENKO, first vice-president of the All-Union Academy of Agricultural Sciences imeni Lenin and M. I. KONDAKOV, president of the USSR Academy of Pedagogic Sciences, addressed congratulations to the staff of the Academy of Medical Sciences.

The meeting participants forwarded a salutatory letter to the CPSU Central Committee, Presidium of the USSR Supreme Soviet and USSR Council of Ministers.

PHOTO CAPTION

Page 3. During the solemn meeting. The Order of Lenin is being pinned to the banner of the Academy of Medical Sciences by G. A. Aliyev, first deputy chairman of the USSR Council of Ministers, member of the Politburo of the CPSU Central Committee. Photo by O. Ivanov (TASS pictorial review).

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VETERINARY MEDICINE

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IDENTIFICATION OF CHLAMYDIAL KAUNAS-1 STRAIN ISOLATED FROM CALVES WITH ENTERITIS IN LITHUANIA

Moscow VOPROSY VIRUSOLOGII in Russian No 6, Nov-Dec 84
(manuscript received 27 May 83) pp 753-755

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[Abstract] A microorganism was isolated from the fecal specimen of a calf with enteritis in Lithuania, which led to chick embryo death in 3-4 days on yolk sac inoculation, and in 6-8 days on allantoic membrane inoculation. The pathogen was identified as Chlamydia psittaci Kaunas-1 on the basis of standard cultural and antigenic analyses. Cultivation in tissue culture led to the development of characteristic inclusion bodies in the cytoplasm with accumulation of RNA and DNA and, eventually, the appearance of elementary bodies. The agent was lethal for 5-6 g mice and Syrian hamsters on intracerebral inoculation. Intravenous injection in rabbit did not lead to death of the animals, and specific antibodies appeared within 4 days of injection. Figures 1; references 6: 3 Russian, 3 Western.
[244-12172]

VIROLOGY

UDC 578.833.27:578.74].083.3

SUBUNIT IMMUNOGEN OF TICK-BORNE ENCEPHALITIS VIRUS: ISOLATION AND SEQUENCING OF GLYCOPROTEIN V3 FROM TWO VIRAL TYPES

Moscow VOPROSY VIRUSOLOGII in Russian No 6, Nov-Dec 84
(manuscript received 19 Jan 84) pp 694-701

CHUMAKOV, M. P., KUSOV, Yu. Yu., RUBIN, S. G., SEMASHKO, I. V., SAL'NIKOV, Ya. A., REYNGOL'D, V. N., PRESSMAN, Ye. K. and TSEKHANOVSKAYA, N. A., Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow; Institute of Bioorganic Chemistry, Siberian Department, USSR Academy of Sciences, Novosibirsk

[Abstract] Isolation and sequencing studies were conducted on glycoprotein V3, which is responsible for tick-borne encephalitis virus immunogenicity, to compare the amino acid compositions of Sof'in (isolated in the Far East in 1937) and Neudorf1 (Western Europe) strains, and to assess the various methods of solubilization. Optimum solubilization of V3 was obtained with the nonionic detergents Tween-80 and octyl-beta-D-glucopyranoside, with the yields ranging from 40 to 70%, depending on the conditions employed. Amino acid sequencing showed that the Soviet strain was enriched in glycine (10.16%), valine (8.66%), lysine (7.21%), glutamic acid (9.91%) and leucine (10.17%), and poor in cysteine (0.44%), methionine (1.03%) and tyrosine (2.50%). At the present time the differences in the amino acid composition in V3, evident among the different strains of the virus, remain enigmatic as far as the biological activity of V3 is concerned. Figures 4; references 20 (Western).
[244-12172]

UDC 578.838.26:578.74].083.3

IMMUNOGENIC SUBUNIT OF TICK-BORNE ENCEPHALITIS VIRUS: IMMUNOLOGY OF GLYCOPROTEIN V3 FROM TWO ANTIGENICALLY DIFFERENT VIRUSES

Moscow VOPROSY VIRUSOLOGII in Russian No 6, Nov-Dec 84
(manuscript received 19 Jan 84) pp 701-706

CHUMAKOV, M. P., RUBIN, S. G., KUSOV, Yu. Yu., SEMASHKO, I. V., SAL'NIKOV, Ya. A., PRESSMAN, Ye. K. and TSEKHANOVSKAYA, N. A., Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow; Institute of Bioorganic Chemistry, Siberian Department USSR Academy of Sciences, Novosibirsk

[Abstract] Hemagglutination inhibition, Ouchterlony technique, and virus neutralization tests were used to assess the immunological characteristics of glycoprotein V3 isolated from two Soviet strains (Sof'in and 256) of the tick-borne encephalitis virus. Titers detected with the V3 preparations and intact viruses were identical. In addition, the V3 antigen showed both homologous reactivity (strain specificity) and heterologous reactivity (groups specificity) by reacting with antisera prepared against other strains and types of the tick-borne virus. Studies with mice and rabbits immunized with the V3 preparations produced a wide spectrum of antibodies evidencing type-, strain- and group specifities. Furthermore, antisera prepared against V3 protected mice from 100-300 lethal doses of the virus. Nevertheless, detection of certain of the type- and group-specific antigenic components was possibly only with intact viruses. References 20: 9 Russian, 11 Western.
[244-12172]

UDC 616.98:578.833.26]-092:612.017.1

VARIABILITY IN IMMUNE RESPONSE TO TICK-BORNE ENCEPHALITIS VIRUS

Moscow VOPROSY VIRUSOLOGII in Russian No 6, Nov-Dec 84
(manuscript received 9 Jan 84) pp 708-715

POGODINA, V. V., LARINA, G. I., FROLOVA, M. P. and BOCHKOVA, N. G., Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow

[Abstract] Syrian hamsters were employed in a study on the variability in the immune responsiveness and pathogenesis of intracerebral inoculation of different strains of the tick-borne encephalitis virus. The viruses were isolated in Siberia and the Soviet Far East and varied considerably in virulence: the mortality with the different viruses ranged from 5 to 100%, with mean survival times measured in the 5 to 237 day range. Generally speaking, an immune response was evident within a day of inoculation, with lymphocytes showing high antigen reactivity in rosette formation, onset of

specific sensitization in migration inhibition tests, increased thymic weight, and moderate antibody formation. The more virulent strains were characterized by a clinical course with low levels of neutralizing and hemagglutinating antibodies and 100% mortality in 5-9 days. In animals with high humoral antibody production the clinical course was essentially asymptomatic, in distinction to the virulent strains (Sof'in, 799, etc.) showing classical signs of encephalitis and extensive brain stem involvement. Figures 6; references 8 (Russian).
[244-12172]

UDC 616.98:578.833.26]-078.73

DETECTION OF TICK-BORNE ENCEPHALITIS VIRUS IN BIOLOGICAL SPECIMENS BY SOLID PHASE IMMUNOPEROXIDASE TECHNIQUE

Moscow VOPROSY VIRUSOLOGII in Russian No 6, Nov-Dec 84
(manuscript received 18 Dec 83) pp 722-724

KARAVANOV, A. S., BYCHKOVA, M. V., BANNOVA, G. G., PIVANOVA, G. P., SARMANOVA, Ye. S., SYSOLYATIN, V. A. and SELYUTINA, T. A., Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow

[Abstract] Comparative studies were conducted on the efficiency and practicability of a solid-phase immunoperoxidase technique in the detection of tick-borne encephalitis virus in biological specimens vis-a-vis immunofluorescent microscopy. The test material consisted of Ix. persulcatus ticks, blood samples from patients, and post mortem brain tissue from patients suspected of viral encephalitides. Examination of 32 brain tissue specimens yielded 24 positives by the immunoperoxidase assay method, and only 7 positives by the immunofluorescent technique. However, examination of ticks yielded a 100% positive rate by the immunofluorescent method, and only 51.4% positives by the immunoenzyme technique. These findings indicate that the immunoperoxidase method is suitable for the examination of human CNS tissue. In studies on tissue cultures exposed to suspect human blood the results with both techniques were equivalent. The immunoperoxidase method, therefore, offers greater technical convenience in processing certain types of tissues, and results within 24 h. References 3; 1 Russian, 2 Western.
[244-12172]

UDC 578.883.29:578.74].083.3

DETECTION OF CONGO-CRIMEAN HEMORRHAGIC FEVER VIRUS BY SOLID PHASE IMMUNOENZYME ASSAY AND PASSIVE HEMAGGLUTINATION

Moscow VOPROSY VIRUSOLOGII in Russian No 6, Nov-Dec 84
(manuscript received 6 Feb 84) pp 724-726

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[Abstract] Comparative assays were conducted on the presence of the Congo-Crimean hemorrhagic fever virus in the brains of suckling mice by determination of infectious titers (in suckling mice), solid phase immunoenzyme assay, and passive hemagglutination. In the immunoenzyme assay, the peroxidase-conjugated antibody consisted of the IgG fraction isolated from immune ascitic fluid of mice, while 10% suspensions of infected suckling mice brains served as the antigen. Monitoring of the brain tissues of suckling mice infected by intracerebral inoculation of the virus demonstrated that determination of infectious titers constituted the most sensitive method of virus detection, followed by passive hemagglutination, and then by the immunoenzyme method. These observations indicate that the serological techniques cannot be relied upon for accurate estimation of virus load in infected tissue. In addition, the simplicity of passive hemagglutination offers obvious technical advantages over the more expensive and demanding immunoenzyme assay. In general, titers detected by the immunoenzyme method were 4- to 8-fold lower than by passive hemagglutination. Figures 1; references 13; 4 Russian, 9 Western. [244-12172]

UDC 578.242.44:578.833.2

COMPARATIVE ANALYSIS OF ELECTROPHORETIC MOBILITY OF FLAVIVIRUS-SPECIFIC HIGH MW PROTEINS

Moscow VOPROSY VIRUSOLOGII in Russian No 6, Nov-Dec 84
(manuscript received 18 Nov 83) pp 740-746

LYAPUSTIN, V. N., ZHANKOV, A. I., DZHIVANYAN, T. I. and LASHKEVICH, V. A., Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow

[Abstract] Polyacrylamide gel electrophoresis was employed in a comparative analysis of the mobility of high MW proteins of 7 tick-borne encephalitis viruses, 6 additional viruses in the tick-borne encephalitis complex, and 4 flaviviruses transmitted by mosquitoes and belonging to different serologic groups. Proteins NV5, NV4 and V3 were found to possess identical electrophoretic mobility in all the tick-borne viruses, while the proteins of the mosquito-transmitted flaviviruses differed among themselves and from the tick-borne complex. In addition, the flavirviruses failed to form NV4(1/2)

protein in infected PES and VNK-21 cells, while most of the tick-borne complex viruses synthesized this protein. The flaviviruses also induced the synthesis of a NV3 with a MW of 44,000 to 50,000 daltons. The V3 protein of the Powassan virus differed from the other tick-borne viruses in its lower mobility and, in addition, NV5 protein of Powassan was quite similar to NV5 of the mosquito flaviviruses. These observations suggest that the Powassan virus may be an intermediate form between flaviviruses transmitted by ticks and mosquitoes. Figures 4; references 24: 4 Russian, 20 Western. [244-12172]

CONFERENCES

MEETING OF BUREAU OF GENERAL BIOLOGY DIVISION, USSR ACADEMY OF SCIENCES HELD CONCURRENTLY WITH PRESIDIUM OF KARELIA BRANCH OF USSR ACADEMY OF SCIENCES

Moscow ZHURNAL OBSHCHEY KHIMII in Russian Vol 46, No 1, Jan-Feb 85
pp 138-139

VYSHESLAVOVA, M. Ya.

[Abstract] The meeting held 12-21 Sep 1984 in Petrozavodsk was devoted to a review of progress from the Institute of Biology and the Forestry Institute. The Forestry Institute searches for the most rational ways of increasing productivity of existing forests and of repopulating the cut-down areas. In connection with inadequate supply of coniferous trees, considerable attention is paid to accelerated planting of this species because it will take 20-40 years to provide balanced tree composition. Another important task concerns production of paper; here, positive results were achieved using bark from coniferous trees. Various types of landscapes were characterized in detail, classifying forest regions and determining specificity of their biogeocenotic structure. A number of forest conservation areas has been established in Karelia. In 1971 a "Small Forest Academy" was established for ecological training. Many papers, monographs and patents originated in this Institute. Most of the work in the Institute of Biology centers on ecologic-physiological studies; mathematical modelling is used extensively including computer analysis of plant growth under controlled conditions. Immunological studies were applied to poultry breeding. Development of fisheries (preventive medicine, preservation of valuable species, special feeding methods) is an important task of this Institute. Attention is also paid to the tick problem in connection with efforts to eradicate the "Karelia fever" [not clearly identified; apparently related to presence of ticks and blood-sucking insects]. [1758-7813]

MISCELLANEOUS

SOVIET PHYSICIAN IN AFGHANISTAN

Moscow MOSCOW NEWS in English No 2, 20 Jan 85 p 7

[Article by Leonid Yakimovich, Kabul correspondent]

[Text] There are 120 Soviet physicians working in Afghanistan--at two Kabul polyclinics, the central military hospital and at the Kabul medical institute. A group of Soviet physician-consultants has been set up at the Ministry for Health Protection of the Democratic Republic of Afghanistan.

Boris Sergeyev, a pediatrician, is in Afghanistan for the second time. On graduating in 1963 from the medical institute in Kazan, his home town, he worked as a children's doctor there. In 1971 he was sent to Afghanistan, returning home three years later. In August 1983 he went back to Afghanistan. In-between the two assignments Boris Sergeyev completed a post-graduate course and got his Candidate of Medical Sciences degree. At present he is a consultant-teacher at the department of children's diseases at the Kabul medical institute, and also works as doctor at the children's hospital in Kabul.

"Some 40 pediatricians will be graduating from the institute this academic year," says Boris Sergeyev. "Throughout their sixth year at the institute our student-doctors work at the children's wing of one of the capital's hospitals, in preparation for independent practice.

Sergeyev speaks Dari. He started learning the language during his first assignment when working at a Kabul polyclinic. The stress was terrific--he had to see up to 80 people a day. He realized that the best way of making time for this was to speak to the patients himself and, so, out came the textbooks.

"The hospital where I work serves not only Kabul residents," Sergeyev says. "Parents living in nearby villages and even in other provinces bring their children. Quite often private practitioners send their patients to us--especially in complicated cases. They know that first-class medical assistance is provided at our hospital."

Sergeyev often treats Afghan children suffering from diseases that are far from children's. Children wounded by bullets and bomb fragments are brought

to him. The basmatches-terrorists use booby traps disguised as toys, fountain pens or match-boxes. In this way the counterrevolution strives to create a tense atmosphere and to scare the population.

"A new children's hospital with 260 beds will open in Kabul in January," says Boris Sergeyev. "The hospital staff will coordinate the activities of the mother and child care centers that are being set up all over the country. Nineteen are already functioning and it is planned to open another 21 centers. In view of the high morbidity rate among Afghan children, the aim is to ensure in future medical protection for every child from birth up to the age of 15. This year children will be vaccinated on a massive scale. Sera against smallpox and cholera and other medicines are delivered regularly from the USSR. In keeping with the latest agreement the USSR will deliver to the DRA 200,000 doses of typhoid serum."

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LIVE TRICHOPHYTOSES VACCINES IN VETERINARY PRACTISE

Moscow SOVIET EXPORT in English No 6(153), 1984 pp 56-57

[Article by S. V. Petrovich, deputy director, All-Union Research Institute of Experimental Veterinary Practise (sic)]

[Text] Many domestic and wild animals suffer from dermatophytoses, first and foremost, from trichophytosis enoountered in over 120 countries. Economic detriment due to trichophytosis is quite significant. Indeed, in sick calves, the gain in weight drops by as much as 6 to 12 kg, while the milk yield of diseased cows decreases. The treatment of sickly animals and quarantine measures involve large expenses, cause a violation of the term of breeding-stock sales, and excessive feed consumption. The employment of drastic medicinal preparation for the traditional topical treatment of affected foci eventually results in essential quality degradation of hides and furs. Not infrequently sick animals cause the infection of human beings.

The contradictory results obtained in experiment on laboratory animal immunization and the cases of recurrent diseases contributed to the widespread opinion that no postvaccinal immunity is attainable for the infection in question. In the control of dermatophytoses, the principal efforts centered on the medicamentous treatment of affected foci, disinfection and quarantine measures. However, the vast experience accumulated by practical veterinary and medicine demonstrated that these measures were capable of liquidating the disease for a certain period of time only, but failed to prevent new outbursts of the infection.

A new approach to solving the problem of dermatophytoses control in animals was made possible owing to the development in the USSR of novel, highly efficient live vaccines. The LTF-130 live vaccine was developed and extensively used in the Soviet Union for cattle protection against trichophytosis. Also available are the SP-1 vaccine against trichophytosis of horses and the Mentavac vaccine for fur-bearing animals and rabbits.

LTF Vaccine. The 15-year period of administering this vaccine in the USSR has demonstrated that it produces a practically lifelong immunity in animals, the prophylactic efficiency of the vaccine being 98-100%.

The LTF-130 vaccine likewise produces a therapeutic action, and doubling the vaccine dose results in curing the affected animals without resorting to additional drug therapy.

A major advantage of the vaccine resides in its areactogenicity. Vaccinal prevention and vaccinotherapy of cows and heifers have been found to exert no effect on the course of pregnancy and the state of offspring.

In the 1967-1983 period more than 400 million animals were vaccinated in the USSR, using the LTF-130. Assuming the number of cattle suffering from trichophytosis prior to vaccine introduction in the veterinary practice to be 100%, towards the end of 1982 this index equalled 0.6% only.

The state Veterinary Service recommends that cattle immunization be continued even where the farm has not been infected for several years, since the trichophytosis causative agent is highly persistent to environmental effects.

Use was made of calves to verify the insusceptibility of immunity to infection by virulent strains from different geographical regions (Austria, Cuba, Czechoslovakia, Denmark, Hungary, Mongolia, and the Netherlands). The vaccinated animals did not contract trichophytosis.

Investigation of the LTF-130 vaccine properties carried out by Wellcolm Co. (Great Britain) and the Norwegian Veterinary Institute corroborated harmlessness and high prophylactic efficiency of the vaccine.

Experts from the GDR (H. Rotenmund and others) in their initial report as regards the use of the Soviet vaccine against trichophytosis noted that at two industrial complexes for rearing young stock the vaccination of 4,857 animals resulted in disease incidence decrease during a 5-month period from 25% to 1%, so that trichophytosis was practically eradicated.

The cost of prophylactic vaccination per calf equals one-fifth of the cost of animal treatment with the antifungal preparation used in the GDR. For 2,200 animals, the overall economy was 12,804 GDR marks and 42 working hours.

In Yugoslavia, the presence of immunity in animals inoculated with the LTF-130 vaccine was corroborated by serological investigations and also by the insusceptibility of animals to experimental infection. According to observations under field conditions, the recovery of all calves occurred within 60 days, while 99.5% of the vaccinated animals kept in contact with sick animals escaped infestation (S. Retricevers and others).

Other Yugoslavian experts also reported high therapeutic and prophylactic properties of the vaccine. In the group of diseased animals (96 calves), all animals recovered, while among 890 calves vaccinated with the object of prophylaxis none fell ill. In the control group (no vaccination), 20% of the calves contracted the disease.

In Norway, Norexim Co. and the Norwegian Veterinary Institute carried out extensive clinical tests of the LTF-130 vaccine, and the beneficial results obtained promoted the vaccination in 1979-1983 of nearly 300,000 head of cattle, and complete sanitation was attained in regions that presented infection hazards.

V/O MEDEXPORT exports the LTF-130 vaccine to Norwary, the Netherlands, Belgium, Sweden, Bulgaria, Hungary, the GDR and Poland. The vaccine has been patented in Great Britain, France, Japan, Canada, Norway, Denmark, the Netherlands, Poland, the GDR, Czechoslovakia, Hungary, Bulgaria, and elsewhere.

SP-1 Vaccine. Soviet scientists succeeded in selecting a highly immunogenic culture with the fixed properties of high growth rate and attenuated virulence. This strain was employed in the development of the SP-1 vaccine. Immunity formation in animals was experimentally found to terminate towards the 30th day. At stud farms and hippodromes, the vaccinated horses, when kept in previously infested stalls, etc., remained sound for a period of eight years (observation duration). Immunity develops in all horses irrespective of breed or age.

The planned vaccination of younger animals is currently performed at practically all horse breeding farms and equestrian sports clubs. So far, more than 300,000 horses have been successfully vaccinated.

The SP-1 vaccine passed thorough clinical tests at the Norwegian Veterinary Institute, and the tested vaccine lots have been found to fully comply with the requirements imposed on the means of specific prophylaxis and theraphy. Under field conditions, the administration of the SP-1 vaccine made it possible to prevent disease incidence among horses, while in the control group cases of trichophytosis were recorded.

The SP-1 vaccine has been patented in the USA, Great Britain, Canada, and France.

Mentavac Vaccine. This vaccine is intended for the control of trichophytosis, in fur-bearing animals. It exerts no side-effects on animals, and experiments showed the vaccine to be harmless and areactogenic.

Polar fox and rabbits subjected twice to immunization remained healthy on being infested with the pathogen. The prophylactic efficiency of the vaccine, as tested at fur farms, was more than 99%. Vaccination involved no complications and caused neither fertility factor reduction, nor fur quality impairment.

Foxes and polar foxes affected to a variable degree by trichophytosis should be vaccinated with a double dose, the recovery of animals occurring after 15-35 days without additional treatments.

Up to now, more than a million foxes, polar foxes and rabbits have been vaccinated successfully.

Soviet scientists have been awarded a Gold Medal and dipolmas of the UN World Intellectual Property Organization for developing and introducing into practice vaccines against trichophytosis.

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BRIEF

NEW COMPUTERIZED PNEUMOTACHOGRAPH--Successful treatment depends greatly on the timely diagnosis of a disease. Specialists from Moscow and Bulgaria have collaborated to develop a new procedure for diagnosing various pulmonary ailments and for studying respiratory functions. Scientists from the two countries have designed a reliable and convenient-to-operate automatic pneumotachograph, which will make possible a sharp reduction in the time needed to examine a patient. This new apparatus can be used to can be used to measure all the fundamental physiological indices in two to three minutes. The information received is processed with a high degree of accuracy by a microcomputer built into the apparatus. The program, located in a special measuring device, is used by the operator, familiar with a set of special symbols which are displayed on a lighted screen, to determine the optimal procedure for conducting the examination. Nurses can quickly learn to operate the apparatus, which is quite important for carrying out large-scale prophylactic examinations. The specialists have begun working on equipment and technology for the mass production of this new device. [Text] [Moscow VECHERNAYA MOSKVA in Russian 8 Feb 85 p 2] 9832

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